EFFECT OF WARM FOOTBATH ON QUALITY OF SLEEP AMONG PATIENTS WITH CANCER IN SELECTED HOSPITAL, COIMBATORE

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The Tamil Nadu Dr. M.G.R Medical University,

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In Partial Fulfillment of the Requirement for the

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This is to certify that the dissertation entitled **"Effect of Warm Footbath on Quality of Sleep among Patients with Cancer at Selected Hospital, Coimbatore"** is a bonafide work done by **Anju Philip, College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences** in partial fulfillment of the University rules and regulations for award of **M.Sc.Nursing Degree** under my guidance and supervision during the academic year **2016.**

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Abstract

The aim of the study was to assess the effect of Warm footbath on quality of sleep among patients with cancer. Quasi experimental, post-test only control group design was adopted for the study. Fifty six samples were selected by using purposive sampling technique. The samples were alternatively assigned to experimental group and control group so as to include 28 samples in each group. The quality of sleep was assessed by using Groningen sleep quality scale. Warm foot bath was administered by the researcher for 15 minutes for five consecutive days in experimental group. For control group, routine care without warm footbath was given. Post test was done to assess the quality of sleep in experimental group and control group by using Groningen sleep quality scale. Descriptive and inferential statistical techniques were used to analyze the data. Unpaired 't' test was used to assess the effect of warm footbath on quality of sleep among patients with cancer. It was identified that the mean value of quality of sleep among patients with cancer in experimental group and control group was 3.96 (SD = 1.7) and 8.07 (SD = 1.70) respectively with a mean difference of -4.11. The calculated 't' value 10.02 was found to be greater than the table value of 3.46 at 0.001 level of significance. The results shows highly significant difference in the quality of sleep among patients with cancer after warm foot bath. Hence it was concluded that warm footbath was an effective therapeutic intervention for improving the quality of sleep among patients with cancer.

INTRODUCTION

Cancer is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death. Cancer is caused by both external factors like tobacco usage, infectious organisms, chemicals, radiation and internal factors like inherited mutations, hormones, immune conditions, and mutations that occur from metabolism. Around one third of cancer deaths are due to the 5 leading behavioural and dietary risks such as high body mass index, low fruit and vegetable intake, lack of physical activity, tobacco use, alcohol use. Tobacco use is the most important risk factor for cancer causing around 20% of global cancer deaths and around 70% of global lung cancer deaths. Cancer causing viral infections such as HBV/HCV and HPV are responsible for up to 20% of cancer deaths in low- and middle-income countries. It is expected that annual cancer cases will raise from 14 million in 2012 to 2022 within the next 2 decades. (American Cancer Society, 2014)

Cancer is now one of the top causes of death in India, after heart attack, up from seventh position in 2000. India has some of the world's highest incidences of cancer: Cervical, gallbladder, oral and pharynx, which are the most common cancers seen. 70% lives are snuffed out in the first year in India, due to late detection. 80% patients consult doctors at a stage when recovery is rare. 71% of deaths occur in the productive age band of 30-69 in India; 15% patients are children and young adults in India, compared to the global average of 0.5%.(Datta.D, 2014)

Sleep is a basic human need; it is a universal biological process common to all people. Historically, sleep was considered a state of unconsciousness. More recently, sleep has come to be considered an altered state of consciousness in which the individuals perception of and reaction to the environment are decreased. (Kozier, 2007)

Sleep is a cyclical process that alternates with longer periods of wakefulness. The sleep wake cycle influences and regulates physiological function and behavioural response. Circadian rhythm is a part of everyday life of living things. The most familiar rhythm is 24 hour, day-night cycle known as circadian rhythm. It influences the pattern of major biological and behavioural functions. Factors such as light, temperature, social activities and work routines affect circadian rhythms. All persons have biological clocks that synchronize their sleep cycles. A person has a poor quality of sleep if his/her sleep-wake cycle changes significantly. Anxiety, restlessness, irritability and impaired judgement are common symptoms of sleep cycle disturbances. Failure to maintain the individuals usual sleep-wake cycle negatively influences the clients overall health. (Perry and Potter, 2010)

Insomnia is defined as a subjective complaint of inadequate nocturnal sleep. It is the most common sleep disorder reported by cancer patients. Although alterations in sleep patterns are endemic among this population, sleep problems are rarely assessed in a typical patient evaluation. Furthermore, patients often fail to mention symptoms to their caregiver, and when sleep is assessed, it is usually in the form of a single question. As a result, insomnia is often unrecognized and untreated. (Graci.G 2005)

Quality sleep is an essential element to tissue repair, proper immune function, and mental health. Chronic lack of sleep has been associated with depression, anxiety, and decreased cognitive function. In people with cancer, poor quality of sleep reduces quality of life, but unfortunately, most patients with cancer do not mention sleep problems unless explicitly asked. Most of the work addressing quality of life issues in patients with cancer has focused primarily on insomnia and fatigue, but both patients living with cancer and long-term Survivors are at risk of having other sleep problems.

Although most of the work related to sleep disorders in cancer patients has focused on insomnia and fatigue, there is a growing body of evidence confirming that other sleep disorders such as sleep disruption, insufficient sleep, restlessness, and diminished sleep duration are prevalent among patients with cancer as well as the general population, and that they decrease quality of life. (Marin-Guzman.R, Alon.Y.A,2015)

Hot water foot bath provides a good sleep, because it relaxes the body and mind. It works by slightly raising the body temperature and after 15 minutes, it starts to drop slowly. This can promote sleep indirectly. Gradual drop of body temperature makes us feel drowsy and therefore we feel more prepared for sleep. A warm footbath also diverts some blood from the head to lower parts of body, reduces brain activity and mimics the pre-sleep state. (Wickman.G,2014)

A warm-water footbath is a local moist heat application. It is a non invasive and easy technique to apply at home. The findings provide empirical support that a warm-water footbath relieves fatigue and insomnia problems of

patients undergoing chemotherapy. It can be a non pharmaceutical method to help patients overcome fatigue and sleep problems during chemotherapy. (Yang H L,et al ,2010)

Sleep disturbance is reported to be a significant problem for patients across the cancer care. Footbath has been found to be a powerful alternative therapy used for sleep induction in spite of sleep medications which has a lot of side effects. The effect of footbath on sleep onset latency and to determine the relaxation level among patients with cancer showed that majority (87%) experienced maximum relaxation and footbath is effective for early sleep onset latency and relaxation. (Cherian. S, 2009)

1.1 Need for the study

Sleep may not come easily to many cancer patients. People with cancer face not only the physical consequences of the disease and its treatment, but often tremendous emotional upheaval. Since physical illness and psychological distress both predict insomnia, cancer patients may be prone to sleep difficulties. When cancer patients are surveyed about their concerns, sleep difficulty typically ranks among the top three concerns, along with fatigue and pain. (Canadian Cancer Society, 1990)

A cross-sectional survey study conducted by Judith R. Davidson et al examined the prevalence of reported sleep problems in patients attending six clinics at a regional cancer centre. The study showed that the most prevalent problems were excessive fatigue (44% of patients), leg restlessness (41%), insomnia (31%) and excessive sleepiness (28%). The breast clinic had a high prevalence of insomnia and fatigue. Insomnia commonly involved multiple awakenings (76% of cases). In 48% of cases, insomnia onset was reported to

occur around the time of cancer diagnosis (falling within the period 6 months pre-diagnosis to 18 months post-diagnosis).The most frequently identified contributors to insomnia were thoughts, concerns, and pain/discomfort. (Davidson, R,J., 2002)

A study was conducted in 102 participants to evaluate the sleep quality among cancer patients with pain, depression, and hopelessness. Patients were assessed by the Pittsburgh Sleep Quality Index (PSQI); a pain assessment tool, the Greek Brief Pain Inventory; a self-report measure of depression, the Beck Depression Inventory; and, finally, the Beck Hopelessness Scale. The study shows that hopelessness, pain treatment and "interference of pain with mood" may influence the quality of sleep in patients with cancer. (Mystakidou, K., et al, 2007)

The longitudinal study was conducted on rates of sleep disturbance; contributions of depression, anxiety, and medication use in sleep disturbance; and associations between sleep quality and quality of life (QOL) during the first year after diagnosis among women with ovarian cancer shows that the majority of patients reported disturbed global sleep (Pittsburgh Sleep Quality Index > 5) and Sleep disturbance is common and persistent in women with ovarian cancer. (Clevenger, L., et al, 2013)

A study conducted on assessment of quality of sleep among patients with cancer who receives chemotherapy shows that cancer patients suffered from combined symptoms related to sleep. Sleeping pills improved sleep induction but were not sufficient to provide sleep quality and prevent daytime dysfunction. Daytime dysfunction was specifically associated with psychological distress. (Nishiura, M., et al, 2015)

For some time now, non-drug strategies have been recommended as first line treatment in the management of some disease especially in case of insomnia. Although medications are equally effective for helping people with insomnia to sleep, they cannot cure the condition and prolonged use regularly resulted in dependency. The findings indicate that non pharmacological interventions produce reliable and durable changes in the sleep patterns of patients with insomnia. An Australian study found 93.5% of insomnia problems were being managed with benzodiazepines, with the majority as ongoing treatment. The extensive use of these drugs will produce the adverse effect of over sedation, ataxia, confusion, respiratory depression, short-term memory impairment, hallucination and depression. (Michael J, 2004)

Here the need for complementary therapy like biofeedback, aromatherapy, relaxation techniques, herbal remedies, massage, acupuncture, meditation and exercise emerge. Footbath is one of the effective methods for inducing sleep. Thermoregulation exhibits powerful interaction with sleep. Yang H,L., et al (2010) conducted a study on effects of warm-water footbath on relieving fatigue and insomnia of the gynaecologic cancer patients receiving chemotherapy shows that warm-water footbath intervention resulted in reduced fatigue and insomnia symptoms for gynaecologic cancer patients during chemotherapy. A warm footbath warms the skin, which causes vessel dilation and induces heat dissipation. Intervention that enhances heat dissipation prior to sleep will improve the sleeping pattern of the subject.

By considering the factors stated above, the researcher is interested to select warm footbath in order to improve the quality of sleep among patients with cancer.

1.2 Statement of the problem

Effect of Warm Foot bath on Quality of sleep among Patients with Cancer in selected Hospital, Coimbatore.

1.3 Objectives

1.3.1 To assess the quality of sleep among patients with cancer.

1.3.2 To evaluate the effect of warm footbath on quality of sleep among patients with cancer.

1.4 Operational definition

1.4.1 Effect

It refers to the change in the quality of sleep after administration of warm footbath.

1.4.2 Warm Footbath

It refers to the immersion of feet into water at 40-44^{0}C for 15 minutes at bed time.

1.4.3 Quality of sleep

It refers to subjective feeling of the patient regarding duration of sleep, depth of sleep and how well they rested during previous night as assessed by Groningen sleep quality scale.

1.4.4 Patient with cancer

It refers to the adult patients who are diagnosed with all type of cancers, and who are admitted in the hospital for 5 days.

1.5 Hypothesis

H_1: There will be a significant difference in the quality of sleep among patients with cancer in experimental and control group after warm footbath.

1.6 Conceptual framework

Conceptualization is a process of forming ideas which utilizes and forms a conceptual frame work for the study. It is the abstract, logical structure which enables the researcher to link the findings to the nursing body of knowledge. A framework is the abstract of logical structure of meaning that guides the development of the study and the body of knowledge.

Conceptual framework of this study was based on the helping art in clinical nursing theory by Ernestine Wieden Bach in 1964. The theory focuses on three concepts such as identification, ministration and validation. According to Wieden Bach, nursing practice consist of identifying a client's need for help, ministering the needed help and validating the needed help.

Identification

Identification involves viewing a client as an individual with unique experiences and understanding the client's perception of the condition. In this study, identification refers to the selection of patients with cancer by using demographic and clinical variables.

Ministration

Ministration refers to the provision of needed help. In this study, the ministration refers to administration of warm footbath for patients with cancer who receives chemotherapy and radiation therapy.

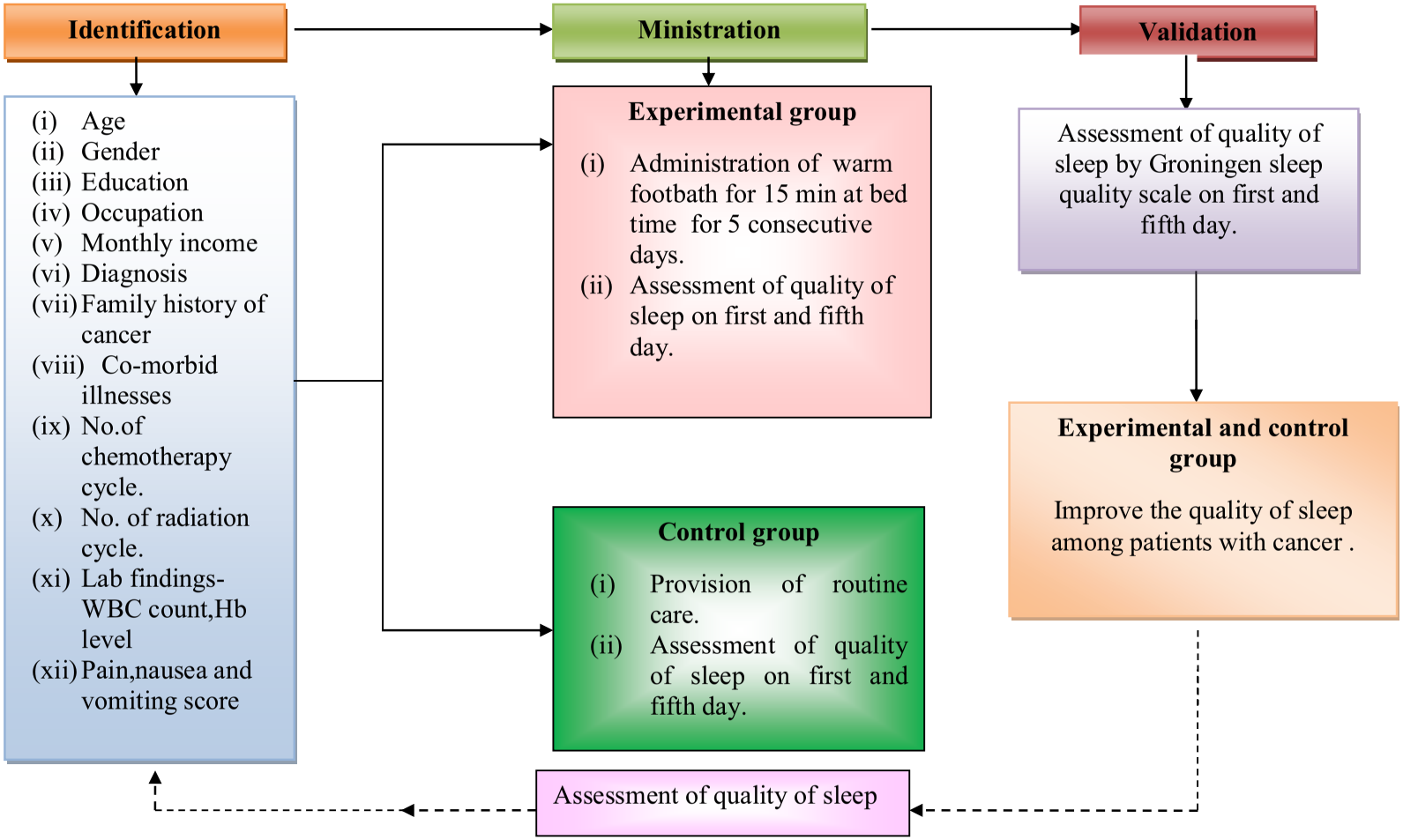
Validation

Validation refers to the collection of evidence that shows that the clients need have been met and the functional ability has been restored as a result of ministration. Here the validation refers to the assessment of quality of sleep after the administration of warm footbath by using Groningen sleep quality scale.

Feedback

It refers to the process by which information is received at each stage of the system and feedback is given based on evaluation. In this study; it refers to improvement of quality of sleep among patients with cancer.

Fig. 1.1 : Conceptual Framework on Modified Widen Bach's Helping Art of Clinical Nursing Theory (1964)



(Source: Wesley, 1964)

1.7 Projected outcome of the study

Administration of warm footbath will improve the quality of sleep among patients with cancer.

REVIEW OF LITERATURE

The review of literature is a crucial look at the existing research that is significant to the investigation that are carrying out. The review of literature is designed to disseminate the investigator with any appropriate information pertaining to the topic being studied. The scope of a literature review should be expansive for the investigator to become knowledgeable about the research problem and narrow enough to include predominantly relevant sources. The literature reviewed by the researcher is based on the following categories:

2.1 Literature related to quality of sleep among patients with cancer

2.2 Literature related to effectiveness of foot bath.

2.3 Literature related to effect of warm footbath on quality of sleep among patients with cancer.

2.1 Literature related to quality of sleep among patients with cancer

Tian Jun et al (2015) conducted a study on sleep status of cervical cancer patients and predictors of poor sleep quality during adjuvant therapy. The study shows that prevalence rate of poor sleep quality was 52.63% for patients before adjuvant therapy, and 64.50% for patients after adjuvant therapy. The difference in the PSQI scores before and after adjuvant therapy among cervical cancer patients was significant (P=0.007).Psychological distress (P=0.045), anxiety (P=0.027), and depression (P=0.028) during adjuvant therapy were the factors associated with poor quality of sleep. Cancer treatments considerably affect the quality of sleep.

He Yajing et al (2015) conducted a cross-sectional study on sleep quality of patients with differentiated thyroid cancer by calculating Pittsburgh Sleep Quality Index (PSQI), demonstrated significantly higher PSQI score and higher rate of poor sleep quality in differentiated thyroid cancer patients (P value not exceeding 0.05 was considered as statistically significant). Three groups of patients were participated in the study. In the first group, 162 patients with DTC received total thyroidectomy, and then ^{131}I therapy. The second group consisted of 84 patients with benign thyroid nodules, who received partial thyroidectomy. The third group was 78 normal healthy control cases. The results confirmed that after ^{131}I therapy, mean level of PSQI rose significantly from 7.59 to 8.78, while the prevalence of poor sleep quality in differentiated thyroid cancer patients increased significantly from 54.32% to 70.99%. The study was conducted on 162 patients of which 79.31% had higher prevalence of poor sleep quality.

Liu Lianqi et al (2012) conducted a study on the longitudinal relationship between fatigue and sleep in breast cancer patients undergoing chemotherapy shows that there is a significant association between fatigue and sleep quality over the course of four cycles of chemotherapy (Pvalues-<0.01), which remained significant after controlling for confounding factors. This prospective study was conducted in 97 women with breast cancer showed that fatigue became worse, while reports of sleep quality remained poor during chemotherapy compared to pre-chemotherapy. The study shows that fatigue was associated with disrupted subjective sleep quality and objective daytime sleepiness during chemotherapy (P value >0.05).

Freire et al (2012) conducted an integrative review regarding health-related quality of life among patients with advanced cancer consisted of a total of 83 patients with advanced cancer, as assessed by McMaster Quality of Life Scale (MQOLS) which showed that perception of psychological well-being and quality of life among patients in palliative care was shown to be significantly affected by pain and poor quality of sleep, causing strong impact in the daily quality of life. The poor quality of sleep can cause many physical and cognitive symptoms such as decreased concentration, signs of fatigue, increased levels of anxiety, nervousness, irritability, gastrointestinal symptoms and predisposition to accidents. These symptoms, especially when associated, are predictors that affect the well-being and cause negative impact on quality of life.

O. Aslan et al (2010) conducted a study on Subjective sleep quality among 175 cancer patients shows that the cancer patients had poor sleep quality. The mean sleep quality score was 9.46 ± 4.669. Most patients (83.82%) used no pharmacologic strategies like lifestyle practices (64.25%), behavioral practices (21.25%) and biologic treatments (4.34%). The reasons given by patients for sleep disturbances were cancer diagnosis (61.71%), adverse effects of therapy (58.85%) and financial problems (36.00%).

Palesh.O.G et al (2011) conducted a study on 823 patients with cancer receiving chemotherapy reported that the proportions of patients with cancer reporting symptoms of insomnia and meeting diagnostic criteria for insomnia syndrome during chemotherapy are approximately three times higher than the proportions reported in the general population. Insomnia complaints persist

throughout the second chemotherapy cycle for the majority of patients with cancer in this study. All P values reported are two-sided; $P < .05$ is considered statistically significant. Insomnia is prevalent, under recognized, undermanaged and understudied among patients with cancer receiving chemotherapy.

Mustian M Karen (2010) conducted a study on global sleep quality in post-treatment cancer survivors shows that 30% to 90% of cancer survivors report some form of impaired sleep quality in post-treatment period, which can be severe enough to increase morbidity and mortality. According to the study, impaired sleep quality, excessive daytime napping, difficulty falling asleep, difficulty staying asleep and waking up too early is among the most distressing adverse effects experienced by cancer survivors.

Mystakidou Kyriaki et al (2006) conducted a study on the Relationship of Subjective Sleep Quality, Pain and Quality of Life in Advanced Cancer Patients shows that poor quality of sleep was significantly correlated to poor quality of life and pain in cancer patients. The study suggested that quality of sleep in patients suffering from stage IV cancer was significantly decreased, and as a result, these patients as a group were defined as “poor sleepers. “There were 120 participants for the study, of which the mean global sleep quality was 12.0±4.6 indicating that the participants were “poor” sleepers. The study also shows that patients with low quality of life were poor quality sleepers. Furthermore, patients, who experienced intense pain had higher PSQI scores, showing that they were suffering from poor sleep quality.

Roscoe A Joseph et al (2007) conducted a study on Cancer-related Fatigue and Sleep Disorders on 93 patients reported that sleep disorders are a common and often chronic problem for both patients with cancer and cancer survivors. The evidence supports a close association between cancer related fatigue and sleep disorders.

Fortner ,B .V et al (2002) conducted a study on Sleep and Quality of Life in Breast Cancer Patients showed that 61% of breast cancer patients who are receiving radiation and chemotherapy had significant sleep problems in comparison with medical patients with general medical conditions. Breast cancer patients having significant sleep problems had greater deficits in many areas of health-related quality of life.

Shuman AG et al (2010) conducted a prospective multisite cohort study on predictors of poor quality of sleep among cancer patients. The number of participants for the study was 457.The analysis showed that pain, xerostomia, depression, presence of a tracheotomy tube, comorbidities, and younger age were statistically significant predictors of poor quality of sleep ($P<.05$).Smoking, problem drinking and female sex were marginally significant($P <0.09$).

C Miaskowski (1999) conducted a pilot study on Pain, fatigue, and sleep disturbances in oncology outpatients receiving radiation therapy for bone metastasis shows that , patients experienced significant sleep disturbances, with a mean sleep efficiency index of 70.7% (estimated using wrist actigraphy). In addition, patients who had received a higher percentage of their radiation treatment reported more sleep disturbances

2.2 Literature related to effectiveness of warm foot bath

Takeshi Azuma et al (2015) published a study in Journal of the Japanese Association of Physical Medicine, Balneology & Climatology shows the effects of Footbath on sleeping time in 3 old patients (70, 82, 84 years old). After two days control period, feet were immersed in a water bath containing about 1,000 PPM CO2 at 40-41 degrees Celsius for 15 minutes at 17:00 for 3 consecutive days. Wrist Mini-motion-logger Autographs were used for recording their activities. The hour for lights-out was 21:00 and that of rising was 06:00. They went to bed between 20:30-20:50 and woke up at 05:30 next morning. In two patients, sleeping time at night began to increase on the second immersion day, which continued even on the following two days without footbath. All the patients showed no changes in daytime activities and they were satisfied with foot bath.

Sam,S,S., (2014) conducted a study on effectiveness of warm footbath therapy on fatigue among patients with chronic renal failure shows that footbath therapy was effective in reducing the fatigue among chronic renal failure patients. Thirty renal failure patients were selected by using purposive sampling technique. A quasi experimental interrupted time series design was used for the study. The results revealed that there was a significant difference between the pre test and post test fatigue scores in the experimental group $F(3,56)= 71.297, p< 0.05$ which shows that footbath therapy was effective in reducing the fatigue.

Makiko Orita et al (2014) conducted a study on effectiveness of warm footbath on heart rate variability in patients with profound multiple disabilities. Eight patients with profound multiple disabilities (four men and four women, aged

17–28 years) were selected for the study. The study shows that warm footbath in patients with profound multiple disabilities, suppressed the parasympathetic nervous activity and stimulated their tactile senses and emotional inputs when soaking their feet in warm water.

Liao W C et al (2013) conducted a study on effect of warm foot bath before bed time on body temperature and sleep in older adults with good and poor sleep. Forty three participants with age greater than 55 years were selected for the study. The design used was two group experimental cross over design. The footbath before sleep significantly increased and retained foot temperatures in both good and poor sleepers. The pattern of core temperatures during foot bathing was gradually elevated (poor sleepers vs. good sleepers=+0.40±0.58°C vs. +0.66±0.17°C). A footbath of 40°C water temperature and 20-min duration before sleep onset increases foot temperatures and distal-proximal skin temperature gradients to facilitate vessel dilatation and elevates core temperature to provide heat load to the body. This footbath does not alter sleep in older adults with good and poor sleep.

Anilda ,A,J., (2013) conducted a study on effectiveness of hot water foot bath on level of fatigue among elderly patient showed that there is effectiveness of hot water footbath on reducing the level of fatigue among elderly patients at the level of $P<0.05$ A total of 30 elderly patients with fatigue were selected by simple random sampling and were assigned to two groups, hot water foot bath was given twice a day for 3 days for experimental group and control group received only routine care. The paired-t test revealed that there is effectiveness of hot water footbath on reducing the level of fatigue among elderly patients at the level of $P<0.05$.

Shihoko Namba et al (2012) conducted a study on effect of warm foot bath on sleep in ICU patients. A single group crossover design was used to examine the effects of foot baths on the sleep outcome in six ICU patients. This study examined the characteristics of these ICU patients. Polysomnograms were recorded for two nights; a foot bath night and non-foot bath night**.** The study concluded that foot baths relieves stress and improves the sleep in ICU patients.

Seo HS et.al, (2011) conducted the study to determine the effectiveness of hot water foot bath on level of fatigue among older Korean adult. A non-equivalent control group, quasi-experimental design was used.50 participants from long-term care were selected and assigned into experimental group (27) control group (23). The participants in experimental group received hot water foot bath at 42◦C soaked for 20 min. The study concluded that hot water footbath decreases the fatigue level when compared to control group. The study results suggest that this method is beneficial for reducing fatigue.

Perry (2011) stated that hot water foot bath is a form of treatment that is recommended for foot and leg cramps, insomnia, nausea, and also to relieve the fatigue in elderly. It is immersion of both feet and ankles in hot water for 10-30 min and is an excellent way to draw blood from inflamed or congested area of the body.

Liao W,C., et al (2008) conducted a study on the effect of warm foot bathing on distal proximal skin temperature gradient in 15 Taiwanese elders. Participants were assigned randomly to receive a 41°C footbath for 40 minutes before sleep onset on night 2 or night 3. The study shows that decreased core temperature and increased distal temperature are associated with shortened sleep onset latency and improves NREM sleep.

Saeki Y et al (2007) conducted a study to investigate the effects of warm foot bathing on autonomic nerve and immune function. Eleven healthy female volunteers (aged 22–24 years) undertook footbaths at 42 °C for10 min, with or without additional mechanical stimulation (air bubbles and vibration). Autonomic responses were evaluated by electrocardiography and spectral analysis of heart rate variability, and by measurement of blood flow in the aural region. White blood cell (WBC) counts, ratios of lymphocyte subsets, and natural killer (NK) cell cytotoxicity was used as indicators of immune function. The study concluded that warm foot bathing produced significant changes in the measured autonomic responses and improved immune status.

Fujita (2000) conducted a study in Osaka University; Graduate school of medicine, JPN to investigate the relaxation response of subjects to footbath; foot massage and foot massage combine with footbath compared with that of control. Ten subjects (mean age 72.0 SD 2.2), physiological data (heart and foot skin temperature) were continuously measured and subjective data were obtained before care, immediately after care, and 120minutes after care. The comparisons were performed with one way ANOVA, Tuckey's test and the Fried man test. Immediately after care, foot massage resulted in a significant decrease in heart rate in comparison with control ($p<0.01$). As for skin temperature immediately aftercare, all forms of care produced significant increases in comparison with control (footbath $p<0.05$: foot massage and foot massage combined with footbath: p<o.o1). The result suggests that these forms of care generate the relaxation response and promote the onset of sleep as shown by the decrease in heart rate and increase in foot skin temperature.

E, J,Sung.,Y, (2000) conducted a study on effects of footbath on sleep in winter suggested that both daily bathing and hot footbath before sleeping facilitates earlier sleep onset. Nine healthy female volunteers were selected for this study. Subjects were assigned to three sleep conditions: sleep after bathing (condition B), sleep after hot footbath (condition F) and sleep without either treatment (control). Polysomnograms were obtained, and body movements during sleep were measured while monitoring both the rectal and skin temperatures of subjects. In addition, subjective sensation was obtained with a questionnaire answered immediately by the subjects on wakening. The rectal temperature increased by approximately1.0.DEG.C.under condition B, but this elevation was not observed under condition F compared with control. The sleep onset latency was shortened under both conditions compared with control. This study suggests that hot footbath before sleeping facilitates earlier sleep onset.

2.3 Literature related to effect of warm footbath on quality of sleep among patients with cancer.

Huei-Lin Yang et al (2010) conducted a study on effects of warm-water footbath on relieving fatigue and insomnia of the gynecologic cancer patients receiving chemotherapy shows that warm-water footbath intervention resulted in reduced fatigue and insomnia symptoms for gynaecologic cancer patients during chemotherapy. There were 25 and 18 participants in the comparison and experimental groups, respectively Participants in the experimental group reported a significant reduction in fatigue and improvement in sleep quality (P<.001) from the second session of chemotherapy and continued to improve during the study period. The findings provide empirical support that a warm-water footbath relieves fatigue and insomnia problems of patients undergoing chemotherapy.

Cherian ,S., (2009) conducted a study on effect of warm footbath on Sleep Onset Latency and Relaxation among Patients with Cancer showed that warm footbath is effective for early sleep onset latency (F=56.15, F=120.1, F=143) (F (2, 195) =3.04) and relaxation .Quasi experimental time series design was used and 40 samples were selected by purposive sampling method of which majority 35(87%) experienced maximum relaxation and early sleep onset latency.

Yamaguchi (2008) conducted a study related on Physiological effects of a mild footbath among 31 cancer patients. They examined on 31 subjects before, during and after 10 minutes' footbath at 41 degree Celsius. About two-thirds of subjects experienced a true rest as well as a mental relaxation during the footbath.

METHODOLOGY

This chapter deals with the description of research approach, research design, research setting, sampling technique, criteria for sample selection, variables of the study, tools for data collection, pilot study, procedure for data collection and techniques of data analysis and interpretation.

3.1 Research Approach

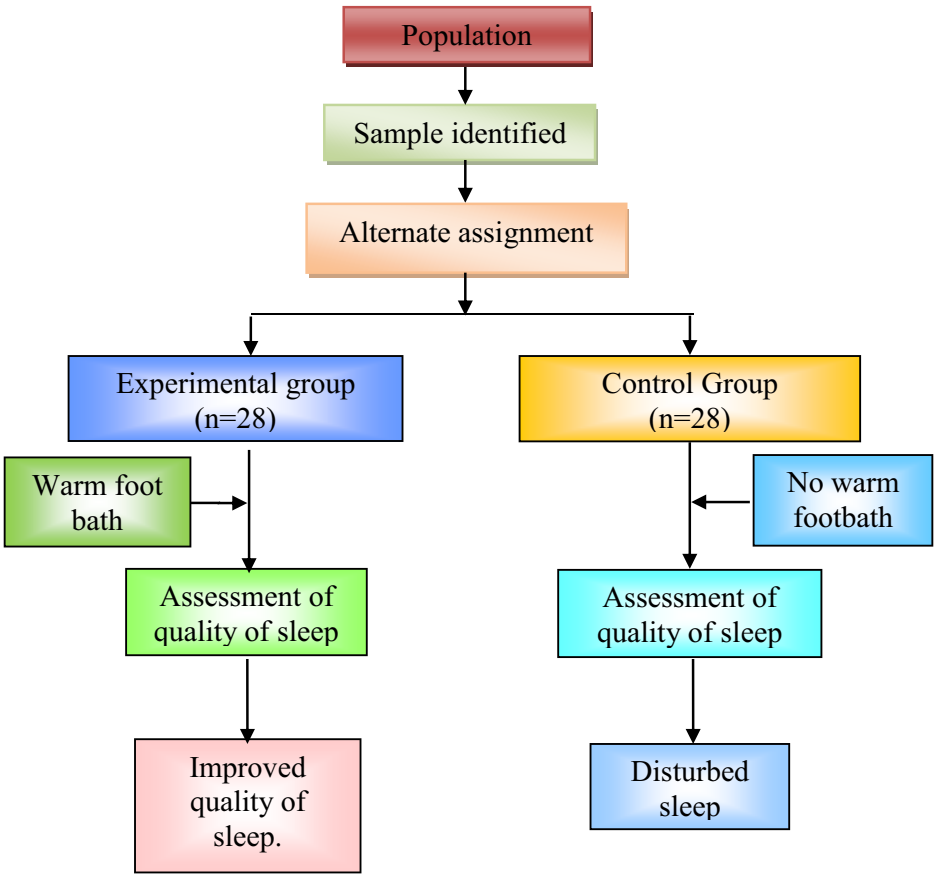
The present study aimed to assess the effect of warm foot bath on quality of sleep among patients with cancer where the researcher manipulates the independent variable and measures the changes in the dependent variable. Hence in view of the nature of problem and to accomplish the objectives, quantitative research approach was adopted for the study.

3.2 Research Design

The research design used for the present study was quasi experimental post test only control group design. Samples were alternatively assigned to the experimental and the control group. Intervention was given only for the experimental group and control group was kept under the routine measures. The design was found to be appropriate to evaluate the effect of warm footbath on quality of sleep among patients with cancer.

Figure 3.1

Schematic representation of Research Design



3.3 Setting

The study was conducted in oncology general ward and special wards of Sri Ramakrishna Hospital, Coimbatore. It is a super specialty hospital equipped with 700 beds. Sri Ramakrishna Institute of Oncology and Research has been found to make a distinct mark in the treatment of cancer with the most advanced equipments. There are various treatment modalities for cancer like surgery, radiation therapy and chemotherapy either, alone or in combination. Patients with different diagnosis of cancers are admitted in the hospital. The bed strength of the oncology wards and special wards is 120 which constitute both pediatrics and adult patients with cancer.

3.4 Population

Target populations for the present study were patients with cancer who are receiving both chemotherapy and radiation therapy or chemotherapy alone in Coimbatore District. The accessible population includes the patients with cancer who are receiving both chemotherapy and radiation therapy or chemotherapy alone at Sri Ramakrishna Hospital, Coimbatore District.

3.5 Sampling

Purposive sample of 56 hospitalized patients were selected for the study. Patients were alternatively assigned for both experimental and control group.

3.6 Criteria for Sample Selection

3.6.1 Inclusion Criteria

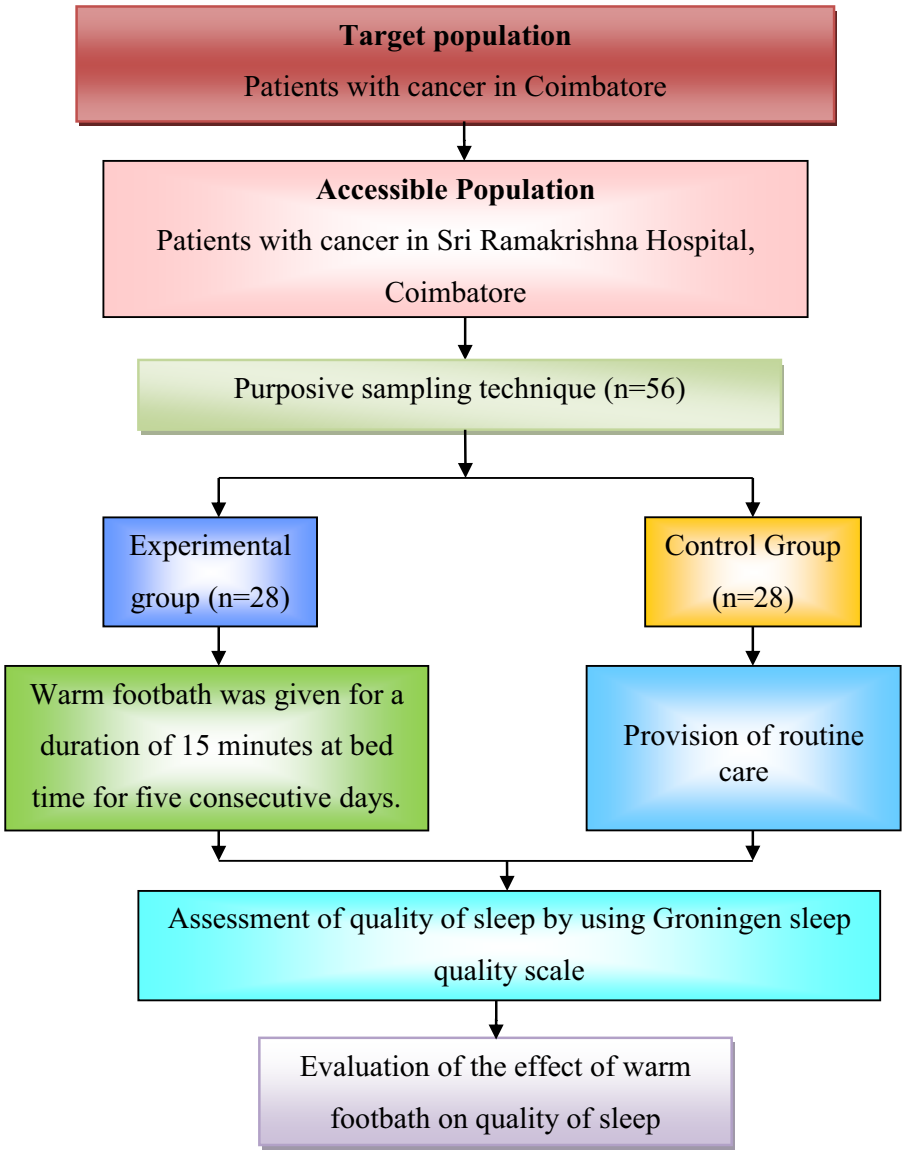
1. Patients with no pain and mild pain as measured by using numerical pain rating scale.
2. Patients without nausea/vomiting and mild nausea/ vomiting as measured by using nausea and vomiting score.

3.6.2 Exclusion criteria

1. Patients who are unconscious and critically ill.
2. Patients with cancer who underwent surgery.
3. Taking medication for sleep.

Figure 3.2

Schematic Representation of Research Process

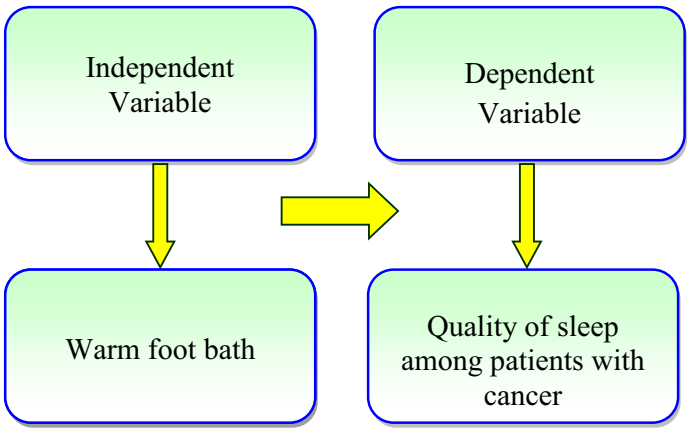


3.7 Variables of the Study

The independent variable in the present study was warm foot bath and the dependent variable was quality of sleep among patients with cancer.

Figure 3.2

Diagrammatic Representation of Variables



3.8 Tools of Data Collection

The demographic variables and clinical variables were framed by using the expert opinion and the supporting literatures and following tools were used for the data collection.

3.8.1 Part-1:Demographic variables and clinical variables

3.8.2 Part-2: Groningen Sleep Quality Scale

3.8.1 Demographic variables and clinical variables:

Demographic variables consists of sample no., age, gender, ward, educational status, occupation, and monthly income.

Clinical variables consists of diagnosis, family history of cancer, co-morbid illness, number of chemotherapy cycles, number of radiation cycles, laboratory findings, techniques used for sleeping at home and influencing factors that affect the sleep.

3.8.2 Groningen Sleep Quality Scale

This tool was developed in Groningen by Mulder-Hajonides Van Der Meulen et al in 1980. The outcome measure was quality of sleep and it is assessed by using the fourteen item Groningen Sleep Quality Scale (1980). GSQS scores range from 0 to 14, a higher score indicating a lower subjective quality of sleep. These statements are related to patients feeling about the difficulty in falling asleep, sleep fragmentation duration of sleep and early morning awakening.

Scoring : The first question out of the fifteen does not count for the total score.

One point : If answer is '**true**' for questions 2,3,4, 5, 6, 7, 9, 11,13, 14, 15

One point : If answer is '**false**' for questions 8, 10, 12.

Interpretation:

The Total score : 14

Score 0 to 5 = Undisturbed or Unrestricted Sleep Last Night,

Score 6 – 7 = Disturbed Sleep Last Night,

Score 8 – 14 = Indicating Poor Sleep the Night Before**.**

3.9 Warm Footbath

3.9.1 Articles:

1. Steel basin
2. Jug
3. Lotion thermometer
4. Covering sheet

3.9.2 Procedure

Explained the procedure to the patient and informed consent was obtained. The patient was asked to sit in a comfortable position and all the materials were assembled near the patient. The basin was filled with hot water. By using lotion thermometer the temperature of the water was checked. The temperature of the water was maintained between 40-44^{o}C. The patient's tolerance was checked by allowing them to touch the water by using their palms. Then the patient was instructed to immerse the foot till the ankles. The patient was covered with a sheet and warm foot bath was given for 15 minutes for five consecutive days. The temperature of the water was checked in between the procedure. Hot water was added when the water cools. The patient was instructed to dry the legs after the procedure.

3.10 Validity and Reliability of the tool

It refers whether an instrument accurately measures what it is supposed to measure. The prepared tool was validated by seven subject experts that included six nursing faculty and one medical expert. Suggestions and recommendations given by the experts were accepted and necessary corrections were made. The content validity of each item of the tool was computed using Lynn's item wise content validity index (I-CVI) and the values were found to be greater than 0.83. The tool was found to have high content validity based on I-CVI interpretation for six or more experts.

The Groningen Sleep Quality scale is a standardized tool to measure the quality of sleep developed by Mulder-Hajonides Van Der Meulen et al in 1980.The tool was found to have a validity of 0.82 and a reliability of 0.65 and 0.60 by split-half method. These values are statistically highly significant.

2.11 Ethical Consideration

The proposed study and tool were presented to the Institution ethical committee and the same was approved by the committee.

3.12 Pilot study

Pilot study was conducted to find out feasibility and practicability of the study. Duration of the pilot study was ten days. The pilot study was conducted in oncology wards and special wards of Sri Ramakrishna hospital, Coimbatore. During the period of pilot study, 10 patients were selected based on the inclusion criteria and exclusion criteria and were assigned to experimental and control group alternatively. Each group consisted of 5 patients. The researcher developed rapport with the patient and explained the benefits of the intervention. The warm footbath was provided for a duration of 15 minutes at bed time for 5 consecutive days.

On the first day of admission demographic and clinical variables were collected for both experimental and control group. Warm foot bath was administered by the researcher for 15 minutes at bedtime for patients in experimental group for five consecutive days. For control group, routine care without warm footbath was given. Post test was done on first and fifth day to assess the quality of sleep in experimental group and control group by using Groningen sleep quality scale. Descriptive and inferential statistical methods were used for data analysis. The calculated 't' value 11.79 was found to be greater than the table value of 2.31 at 0.05 level of significance. The result of the pilot study revealed that warm footbath was effective in improving the quality of sleep among patients with cancer.

3.11.1 Changes after pilot study

The researcher was asked to include the pain assessment and nausea, vomiting assessment in order to maintain homogenesity of the sample. The researcher was given assistants to provide intervention at the correct time.

3.12 Procedure for Data Collection

The main study was conducted over a period of one month from 23.06.2015 to 19.07.2015. During the period of data collection, 56 patients with cancer were selected based on the inclusion criteria and were assigned to experimental and control group alternatively. The experimental group consisted of 28 patients and control group consisted of 28 patients. The researcher developed rapport with the patients receiving warm footbath and explained the benefits of the intervention.

On the first day of admission, demographic variables, clinical variables and screening were done for patients with cancer. On the next day, warm foot bath was administered by the researcher with the duration of 15 minutes for five consecutive days in patients of experimental group. On the other hand, routine care was given for patients in control group. Post test was done on first and fifth day for both experimental and control group to assess the quality of sleep among patients with cancer by using Groningen sleep quality scale.

3.13 Techniques of Data Analysis and Interpretation

Descriptive and inferential statistical techniques were used for data analysis. Descriptive statistics was applied for the analysis of demographic data and clinical data. The frequency tables were formulated for all significant information. Mean, Mean difference, Standard Deviation was calculated. Paired ‘t’ test was used to

evaluate the quality of sleep on the first and the fifth day. Un paired 't' test was used to find out the significance of warm footbath on quality of sleep among patients with cancer.

3.13.1 Paired 't' test

Paired 't' test was used to analyse the difference the quality of sleep on first and fifth day in experimental and control group.

$$t = \frac{\bar{d}}{SE}$$

where,

$$SE = \frac{SD}{\sqrt{n}}$$

$$SD = \sqrt{\frac{\sum D^2 - \frac{\left(\sum D\right)^2}{n}}{n-1}}$$

$\bar{d}$ = Mean difference between test score

SE = Standard Error

SD = Standard deviation of the test score

n = Number of samples

3.13.2 Un paired 't' test

Un paired 't' test was used to analyse the effect of Warm footbath among patients with cancer in experimental and control group.

$$t = \frac{\overline{X_1} - \overline{X_2}}{SE}$$

Where,

$$SE = SD \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

$$SD = \sqrt{\frac{\sum \left(x_1 - \overline{x_1}\right)^2 + \sum \left(x_2 - \overline{x_2}\right)^2}{n_1 + n_2 - 2}}$$

$\overline{X}_1$ = Mean sleep quality scores of the experimental group

$\overline{X}_2$ = Mean sleep quality scores of the control group

SE = Standard Error

SD = Combined standard deviation

n_1 = Number of samples in experimental group

n_2 = Number of samples in control group

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of data collected from 56 patients with cancer. The aim of the study was to determine the effect of warm foot bath on quality of sleep among patients with cancer at selected hospital, Coimbatore. A total number of 56 patients were selected by using purposive sampling technique. The total samples were alternatively assigned to the experimental group and control group. The experimental group received warm footbath and the control group received routine care. Quality of sleep was assessed using Groningen sleep quality score. Descriptive and inferential statistical methods were employed to organize and analyze the data.

ORGANIZATION OF FINDINGS

Section I

Demographic variables of patients with cancer in the experimental and control group.

Section II

Clinical variables of patients with cancer in the experimental and control group.

Section III

Assessment on quality of sleep among patients with cancer in the experimental and control group.

Section IV

Effect of warm footbath on quality of sleep among patients with cancer in the experimental and control group.

Section I

4.1 Demographic Variables among Patients with Cancer

This section presents the demographic variables collected from patients with cancer. The demographic variables collected were age, gender, educational status, occupation and monthly income.

Table 4.1.1

Age of Patients with Cancer

(n=56)

S. No	Age	Experimental group (n=28)		Control group (n=28)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1.	21-30 Years	-	-	2	7.2
2.	31-40 Years	2	7.2	2	7.2
3.	41-50 Years	7	25	7	25
4.	51-60 Years	6	21.4	6	21.4
5.	61-70 Years	11	39.2	11	39.2
6.	71-80 Years	2	7.2	-	-

The above table 4.1.1 depicts the age of patients with cancer and the results shows that in the experimental group 11 (39.2%) patients belonged to the age group of 61-70 years, 6 (21.4%) patients belonged to the age group of 51-60 years, 7 (25%) patients belonged to the age group of 41-50 years and 2 (7.2%) patients belonged to the age group of 31-40 years and 71-80 years respectively. In the control group 11 (39.2%) patients belonged to the age group of 61-70 years, 6 (21.4%) patients belonged to the age group of 51-60 years, 7 (25%) patients belonged to the age group of 41-50 years and 2 (7.2%) patients belonged to the age group of 21-30 years and 31-40 years respectively.(Figure 4.1.1)

Table 4.1.2

Gender of Patients with Cancer

(n=56)

S. No	Gender	Experimental group (n=28)		Control group (n=28)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1.	Male	17	60.7	19	67.9
2.	Female	11	39.3	9	32.1

The above table 4.1.2 explains the gender of patients with cancer and the results reveals that, in the experimental group 17 (60.7%) patients were males and 11 (39.3%) patients were females and in the control group 19 (67.9%) patients were males and 9 (32.1%) patients were females. (Figure 4.1.2)

Figure 4.1.1

Age of Patients with Cancer

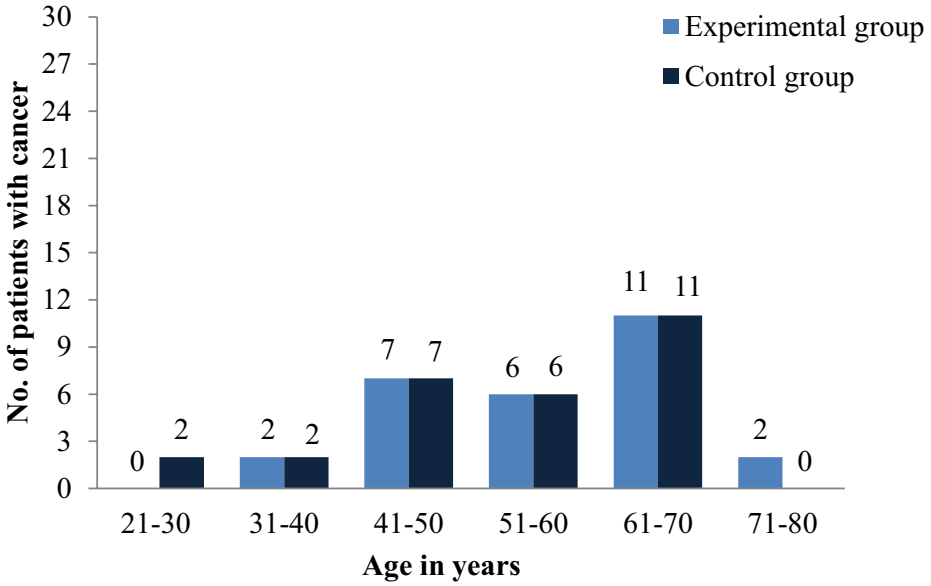


Figure 4.1.2

Gender of Patients with Cancer

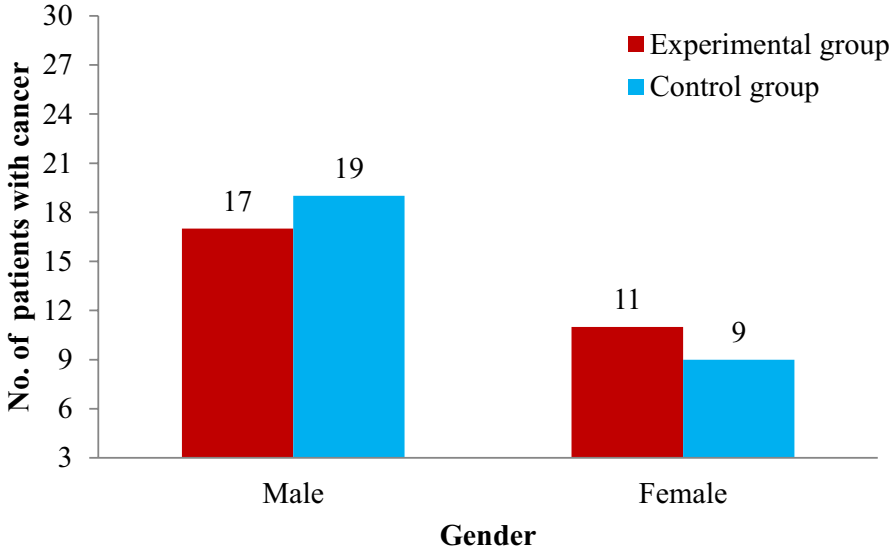


Table 4.1.3

Educational Status of Patients with Cancer

(n=56)

S.No	Educational status	Experimental group (n=28)		Control group (n=28)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1.	Illiterate	15	53.6	13	46.42
2.	Primary School	8	28.6	8	28.6
3.	High School	4	14.2	4	14.28
4.	Higher Secondary	-	-	2	7.1
5.	Graduate	1	3.6	1	3.6

The above table 4.1.3 depicts the educational status of patients with cancer and the results shows that in the experimental group 15 (53.6%) were illiterate, 8 (28.6%) had primary education, 4 (14.2%) had high school education and 1 (3.6%) had undergone graduation. In the control group, 13 (46.42%) were illiterate, 8 (28.6%) had primary education, 4 (14.28%) had high school education, 2 (7.1%) had higher secondary education and 1 (3.6%) had undergone graduation. (Figure 4.1.3)

Table 4.1.4

Occupational Status of Patients with Cancer

(n=56)

S.No	Occupation	Experimental group (n=28)		Control group (n=28)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1.	Employed	15	53.5	19	67.9
2.	Unemployed	13	46.5	9	32.1

The above table 4.1.4 depicts the occupational status of patients with cancer. In the experimental group 15 (53.5%) patients were employed, 13(46.5%) patients were unemployed and in the control group 19 (67.9%) patients were employed and 9 (32.1%) were unemployed. (Figure 4.1.4)

Figure 4.1.3

Educational status of Patients with Cancer

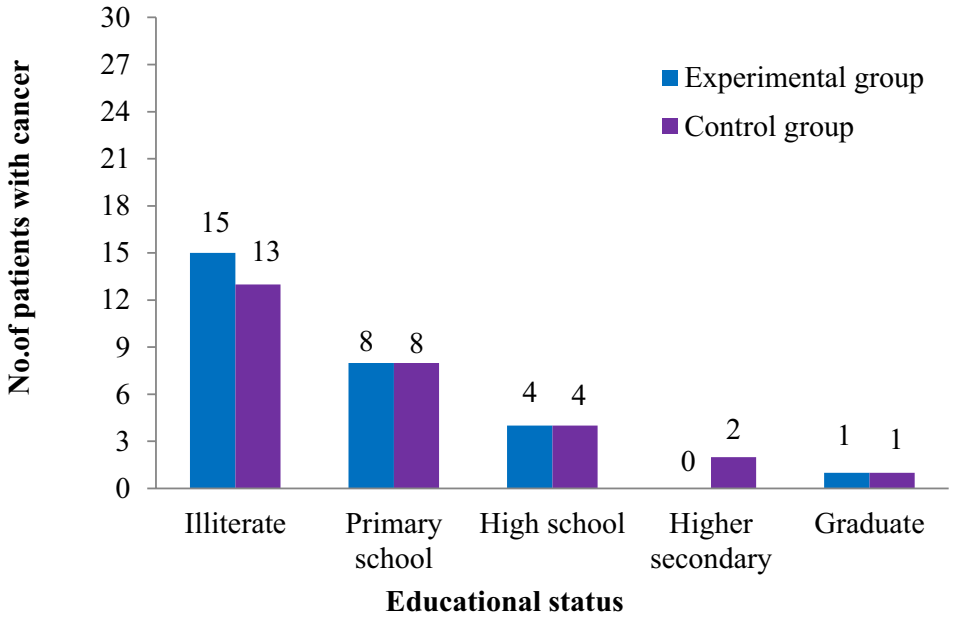


Figure 4.1.4

Occupational status of Patients with Cancer

Table 4.1.5

Monthly Income of Patients with Cancer

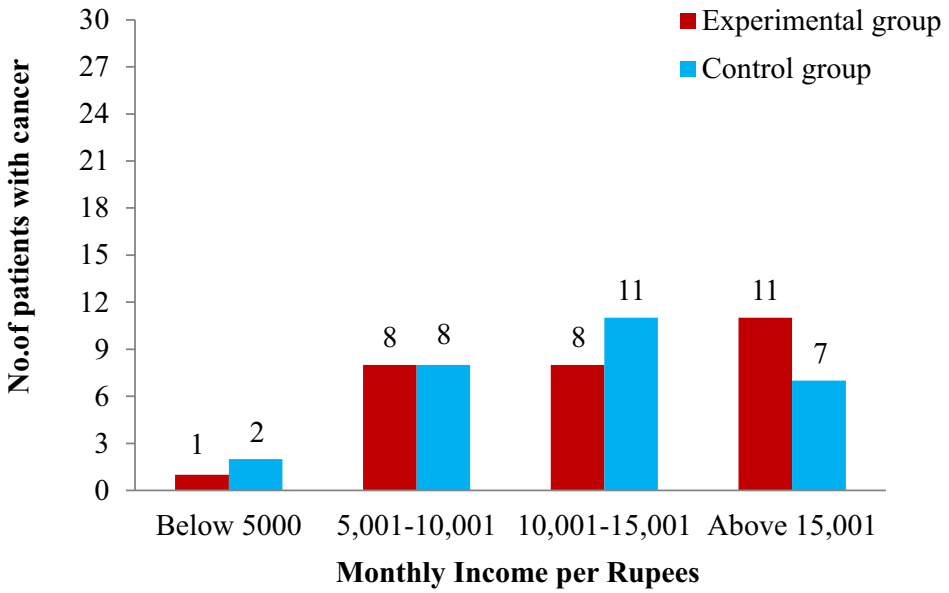
(n=56)

S.No	Income (Per month in Rs.)	Experimental group (n=28)		Control group (n=28)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1.	Below 5000	1	3.6	2	7.1
2.	5001-10,000	8	28.6	8	28.6
3.	10,001-15,001	8	28.6	11	39.3
4.	Above 15,001	11	39.2	7	25

The above table 4.1.5 explains the monthly income of patients with cancer. The results shows that in the experimental group 11 (39.2%) patients had monthly income above Rs. 15,000, and 8 (28.6%) had monthly income between Rs. 5,001-10,000 and 10,001-15,001 respectively and 1 (3.6%) had monthly income below Rs.5000. In the control group 11 (39.3%) patients had monthly income between Rs.10,001-15,001, 7 (25%) had monthly income above Rs.15,001, 8 (28.6%) had monthly income between Rs.5001-10,000 and 2 (7.1%) had monthly income below Rs. 5000 . (figure 4.1.5)

Figure 4.1.5

Monthly Income of Patients with Cancer



Section II

4.2 Clinical Variables among Patients with Cancer

This section presents the clinical variables collected from patients with cancer. The clinical variables are diagnosis of the patient, family history of cancer, co-morbid illnesses, number of chemotherapy cycles, number of radiation cycles, laboratory values, techniques used for sleeping and influencing factors like noise, pain etc. that affects the patients sleep.

Table 4.2.1

Family History of Patients with Cancer

(n=56)

S. No	Family history of cancer	Experimental group (n=28)		Control group (n=28)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1.	Present	1	3.6	2	7.1
2.	Absent	27	96.4	26	92.9

The above table 4.2.1 depicts the family history of patients with cancer. The results reveals that, in the experimental group 27 (96.4%) patients had no family history of cancer and 1(3.6%) had family history of cancer. In the control group 26 (92.9%) patients had no family history of cancer and 2 (7.1%) had family history of cancer. (Figure 4.2.1)

Table 4.2.2

Co-Morbid Illnesses of Patients with Cancer

(n=56)

S. No	Co-morbid illnesses	Experimental group (n=28)		Control group (n=28)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1.	Hypertension	3	10.7	6	21.4
2.	Diabetes Mellitus	1	3.6	1	3.6
3.	Rheumatoid arthritis	1	3.6	-	-
4.	IHD	1	3.6	-	-
5.	Bronchial Asthma	-	-	2	7.1
6.	No illness	22	78.5	19	67.9

The above table 4.2.2 depicts the co-morbid illnesses of patients with cancer and it reveals that, in the experimental group 3 (10.7%) had a hypertension, 1 (3.6%) had diabetes mellitus, 1 (3.6%) had rheumatoid arthritis, 1 (3.6%) had Ischemic heart disease and 22 (78.5%) patients did not have any co-morbid illness. In the control group 6 (21.4%) had hypertension, 1 (3.6%) had diabetes mellitus, 2 (7.1%) had bronchial asthma and 19 (67.9%) did not have any co-morbid illness. (Figure 4.2.2)

Figure 4.2.1

Family History of Patients with Cancer

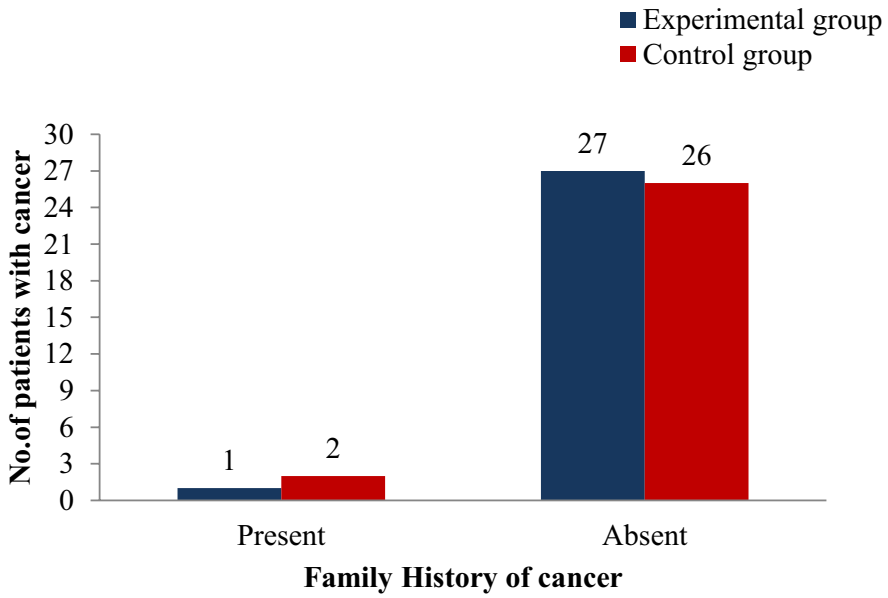


Figure 4.2.2

Co-morbid Illness of Patients with Cancer

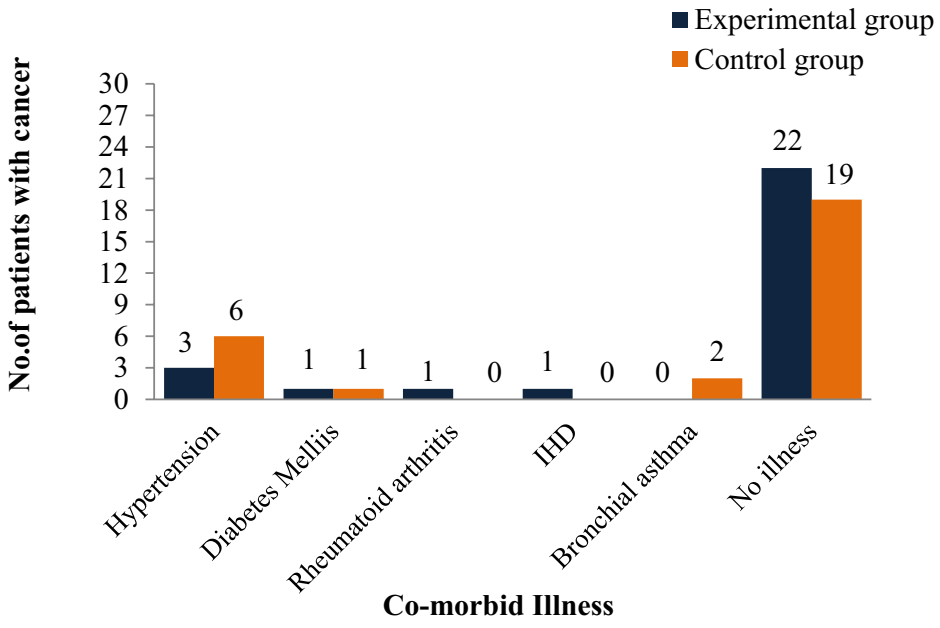


Table 4.2.3

Number of Chemotherapy cycles of Patients with Cancer

(n=56)

S.No	No. of chemotherapy cycles	Experimental group (n=28)		Control group (n=28)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1.	I cycle	5	17.9	5	17.9
2.	II cycle	7	25	11	39.3
3.	III cycle	5	17.9	4	14.3
4.	IV cycle	8	28.5	6	21.4
5.	V cycle	2	7.1	2	7.1
6.	VI cycle	1	3.6	-	-

The above table 4.2.3 shows the number of chemotherapy cycles of patients with cancer and it reveals that in the experimental group 8 (28.5%) had undergone 4 cycles of chemotherapy, 7 (25%) had undergone 2 cycles of chemotherapy, 5 (17.9%) had undergone 1 and 2 cycles of chemotherapy respectively, 2 (7.1%) had undergone 5 cycles of chemotherapy and 1(3.6%) had undergone 5 cycles of chemotherapy. In the control group, 11 (39.3%) had undergone 2 cycles of chemotherapy, 6 (21.4%) had undergone 4 cycles of chemotherapy, 5 (17.9%) had undergone 1 cycle of chemotherapy, 4 (14.3%) had undergone 3 cycles of chemotherapy and 2 (7.1%) had undergone 5 cycles of chemotherapy. (Figure 4.2.3)

Table 4.2.4

Hemoglobin level of Patients with Cancer

(n=56)

S.No	Hemoglobin Level (gm/dL)	Experimental group (n=28)				Control group (n=28)			
		Male		Female		Male		Female	
		Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
1.	Below 12	2	7.14	10	35.72	5	17.86	6	21.43
2.	12- Less than 14.5	-	-	-	-	-	-	3	10.71
3.	14.5-16.5	16	57.14	-	-	14	50	-	-
4.	Above 16.5	-	-	-	-	-	-	-	-

The above table 4.2.4 depicts hemoglobin level of patients with cancer. The results shows that in the experimental group, 16 (57.14%) male patients had hemoglobin level between 14.5-16.5 gm/dL, 2 (7.14%) male patients had hemoglobin level below 12 gm/dL and 10 (35.72%) female patients had hemoglobin level below 12 gm/dL. In the control group 14 (50%) male patients had hemoglobin level between 14.5-16.5 gm/dL and 5 (17.86%) male patients had hemoglobin level below 12 gm/dL, 3 (10.71%) female patients had hemoglobin level between 12- <14.5 gm/dL and 6 (21.43%) female patients had hemoglobin level below 12 gm/dL.(Figure 4.2.4)

Figure 4.2.3

Number of Chemotherapy cycles of Patients with Cancer

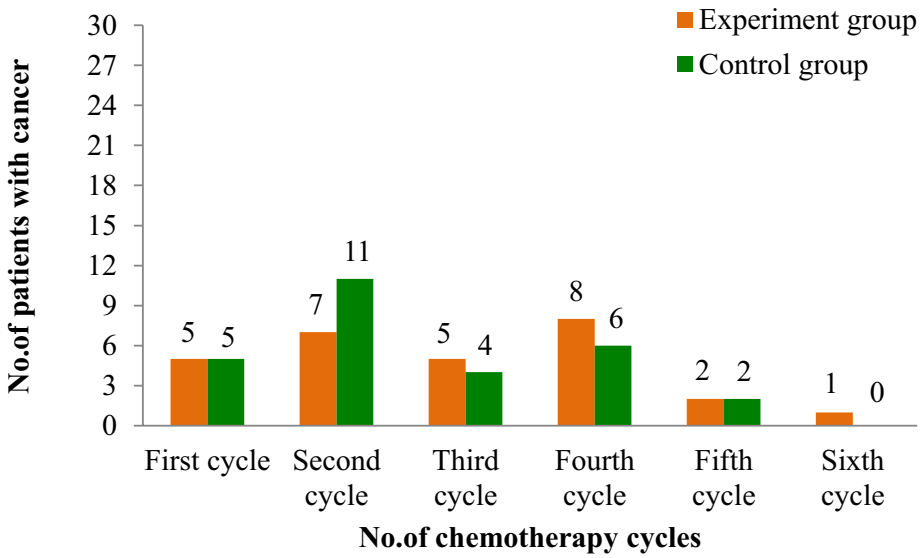


Figure 4.2.4

Hemoglobin level of Patients with Cancer

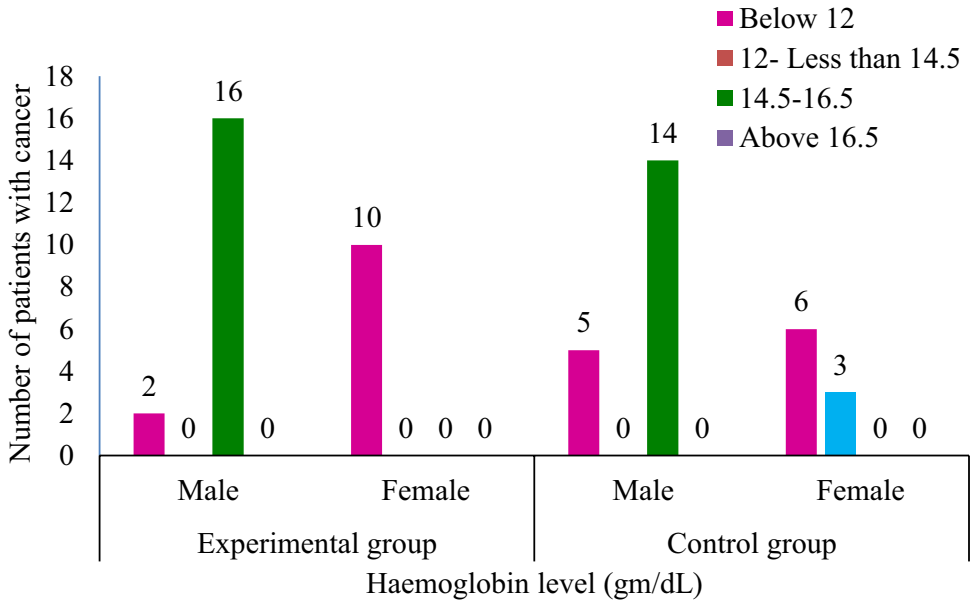


Table 4.2.5

WBC level of Patients with Cancer

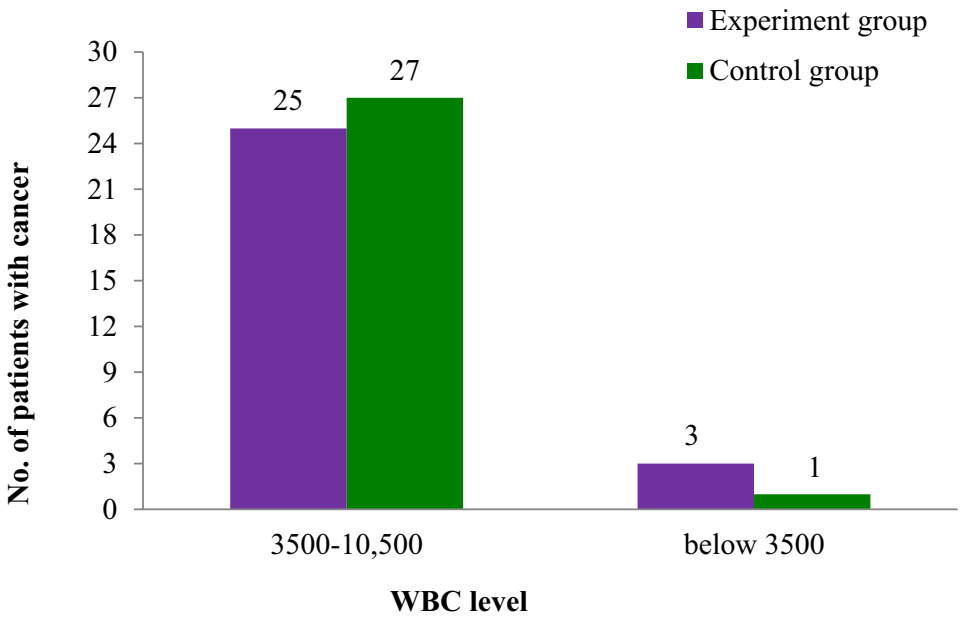
(n=56)

S.No	WBC Level (cmm)	Experimental group (n=28)				Control group (n=28)			
		Male		Female		Male		Female	
		Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
1.	3500-10,500	15	53.6	10	35.7	18	64.29	9	32.14
2.	Below 3,500	3	10.7	-	-	1	3.57	-	-

The above table 4.2.5 depicts the WBC level of patients with cancer and the results shows that in the experimental group, 15 (53.6%) male patients had WBC level between 3,500-10,500cmm, 3 (10.7%) male patients had WBC level below 3,500cmm and 10 (35.7%) female participants had WBC level between 3500-10,500cmm. In the control group 18 (64.29%) male patients had WBC level between 3,500-10,500cmm, 1 (3.57%) male patients had WBC level below 3,500cmm, 9 (32.14%) female patients had WBC level between 3500-10,500cmm. (Figure 4.2.5)

Figure 4.2.5

WBC level of Patients with Cancer



Section III

4.3 Assessment on Quality of Sleep among Patients with Cancer in the Experimental and Control group

This section deals with the assessment on quality of sleep among patients with cancer. The quality of sleep among patients with cancer was assessed by using Groningen Sleep Quality Scale. The quality of sleep was categorized as normal sleep, disturbed sleep and poor sleep. Post test analysis on quality of sleep among patients with cancer based on sleep quality scores were obtained by using the Groningen Sleep Quality scale.

Findings were presented under the following headings.

- Assessment on quality of sleep among patients with cancer in the experimental group after warm footbath.
- Assessment on quality of sleep among patients with cancer in the control group.
- Comparison on quality of sleep among patients with cancer in the experimental and control group after warm footbath.
- Comparison on sleep quality scores among patients with cancer in the experimental group and control group after warm footbath.

Table 4.3.1

Assessment on Quality of Sleep among Patients with Cancer in Experimental group after Warm Footbath

(n=56)

S.No	Quality of sleep	No. of patients			
		First day		Fifth day	
		Frequency	Percentage	Frequency	Percentage
1.	Normal sleep	10	35.7	23	82.1
2.	Disturbed sleep	10	35.7	4	14.3
3.	Poor sleep	8	28.6	1	3.6

The above table 4.3.1 depicts the quality of sleep among patients with cancer in the experimental group after warm footbath. The results shows that in the experimental group, on the first day 10 (35.7%) patients had normal and disturbed sleep respectively and 8 (28.6%) patients had normal sleep. On fifth day 23 (82.1%) patients had normal sleep, 4 (14.3%) patients had disturbed sleep and 1 (3.6%) patient had poor sleep.

Table 4.3.2

Assessment on Quality of Sleep among Patients with Cancer in Control group

(n=56)

S.No	Quality of sleep	No. of patients			
		First day		Fifth day	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1.	Normal sleep	2	7.15	2	7.15
2.	Disturbed sleep	9	32.15	8	28.57
3.	Poor sleep	17	60.7	18	64.28

The above table 4.3.2 explains the quality of sleep among patients with cancer in the control group. The results shows that in the control group, on the first day, 2 (7.15%) patients had normal sleep, 9 (32.15%) patients had disturbed sleep and 17 (60.7%) patients had poor sleep. On the fifth day, 2 (7.15%) patients had normal sleep, 8 (28.57%) patients had disturbed sleep and 18 (64.28%) patients had poor sleep.

Figure 4.3.1

Assessment on Quality of Sleep among Patients with Cancer in Experimental group after Warm Footbath

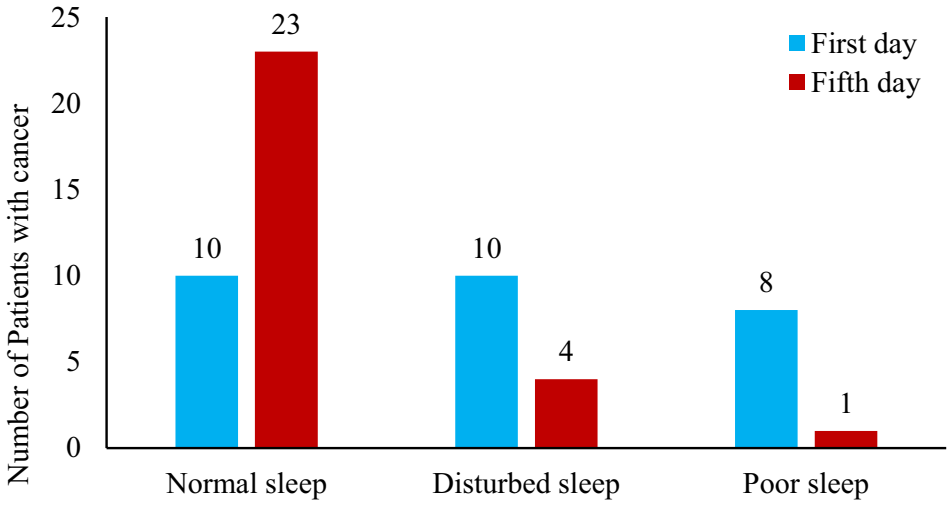


Figure 4.3.2

Assessment on Quality of Sleep among Patients with Cancer in Control group

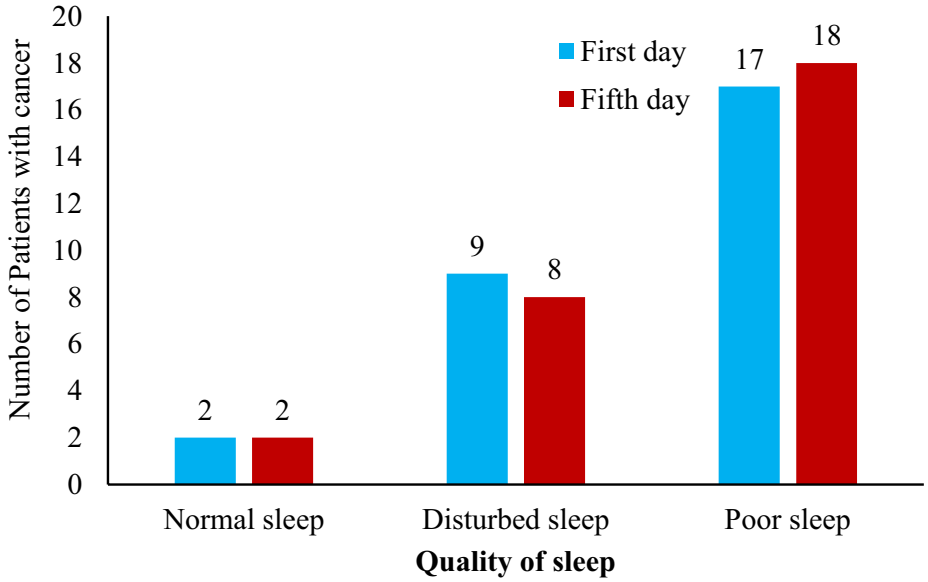


Table 4.3.3

Comparison on Quality of Sleep among Patients with Cancer in Experimental and Control group after Warm Footbath

(n=56)

S.No	Quality of sleep	No. of patients							
		Experimental group				Control group			
		First day		Fifth day		First day		Fifth day	
		Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
1.	Normal sleep	10	35.7	23	82.1	2	7.15	2	7.15
2.	Disturbed sleep	10	35.7	4	14.3	9	32.15	8	28.57
3.	Poor sleep	8	28.6	1	3.6	17	60.7	18	64.28

The above table 4.3.3 depicts the quality of sleep among patients with cancer in the experimental and control group. The results reveals that in the experimental group 10 (35.7%) patients had normal and disturbed sleep on first day respectively and 8 (28.6%) patients had poor sleep. On the fifth day 23 (82.1%) patients had normal sleep, 4 (14.3%) patients had disturbed sleep and 1 (3.6%) patients had poor sleep. In the control group 2 (7.15%) patients had normal sleep, 9 (32.15%) patients had disturbed sleep, and 17 (60.7%) patients had poor sleep on first day. On the fifth day 2 (7.15%) patients had normal sleep, 8 (28.57%) patients had disturbed sleep and 18 (64.28%) patients had poor sleep.

Figure 4.3.3

Comparison on Quality of Sleep among Patients with Cancer in Experimental and Control group after Warm Footbath

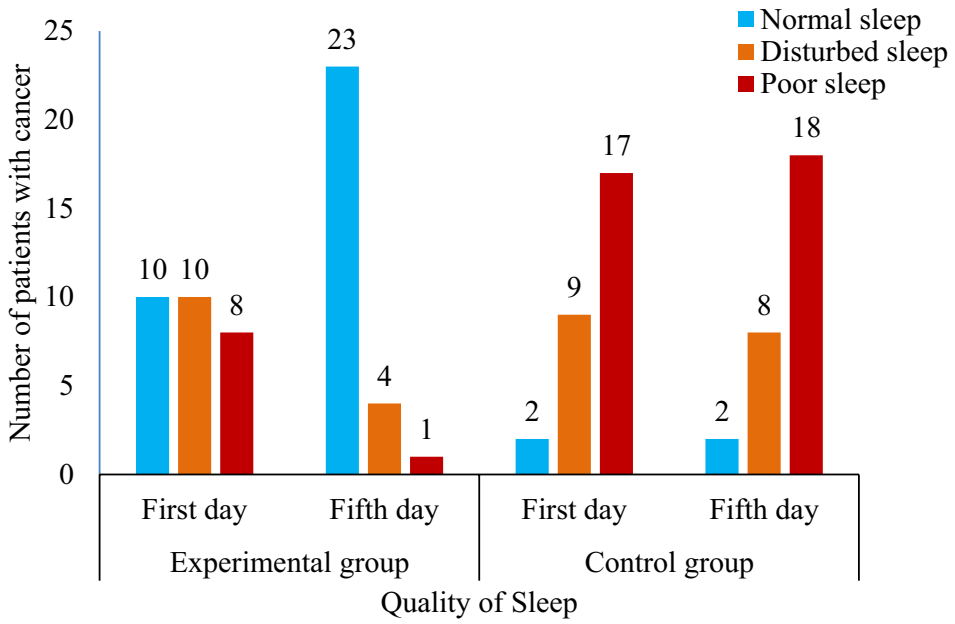


Table 4.3.6

Comparison on Sleep Quality scores among Patients with Cancer in Experimental and Control group after Warm Footbath

(n=56)

S.No	Sleep quality score	No. of patients							
		Experiment group				Control group			
		First day		Fifth day		First day		Fifth day	
		Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage	Frequency	Percentage (%)
1.	0-2	2	7.1	6	21.43	-	-	-	
2.	3-5	8	28.6	16	57.14	2	7.14	2	7.14
3.	6-8	15	53.6	6	21.43	15	53.6	13	46.43
4.	9-11	3	10.7	-	-	9	32.12	13	46.43
5.	12-14	-	-	-	-	2	7.14	-	-

The above table 4.3.6 explains the sleep quality scores obtained by patients with cancer in the experimental and control group on first and fifth day after warm footbath. The results shows that in the experimental group, 2 (7.1%) patients had the sleep quality score between 0-2, 8 (28.6%) had the score between 3-5,15 (53.6%) had the score between 6-8 and 3 (10.7%) had the score between 9-11 and none of them had the score between 12-14 on the first day. On the fifth day, 6 (21.43%) patients had the sleep quality score between 0-2, 16 (57.14%) had the score between 3-5, 6 (21.43%) had the score between 6-8 and none of the patients had the score between 9-11 and 12 -14. In the control group, 2 (7.14%) patients had the sleep quality score between 3-5,15 (53.6%) had the score between 6-8, 9 (32.12%) had the score between 9-11, 2 (7.14%) had the score between 12-14 on first day . On fifth day, 2 (7.14%) patients had sleep quality score between 3-5,13 (46.43%) had the score between 6-8,13 (46.43%) had the score between 9-11.

Figure 4.3.6.1

Comparison on Sleep Quality scores among Patients with Cancer in Experimental and Control group after Warm Footbath

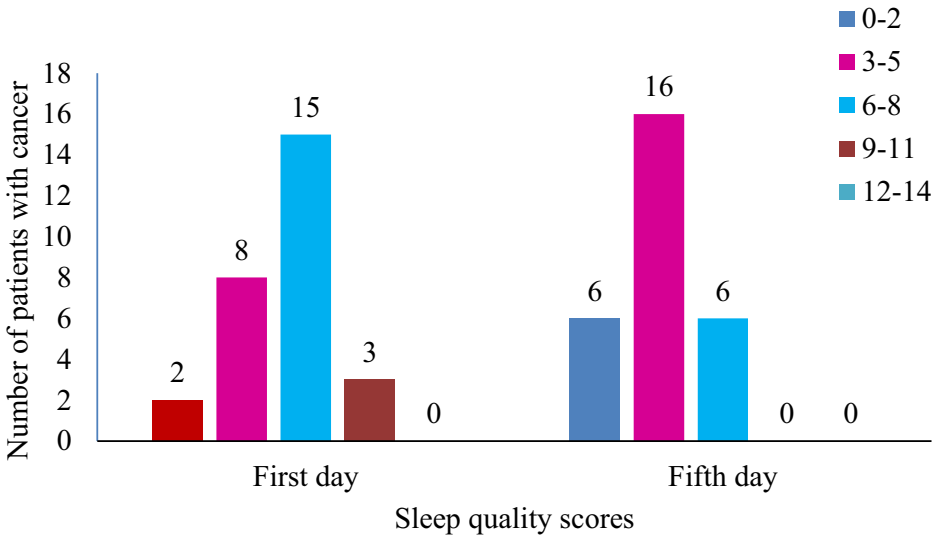
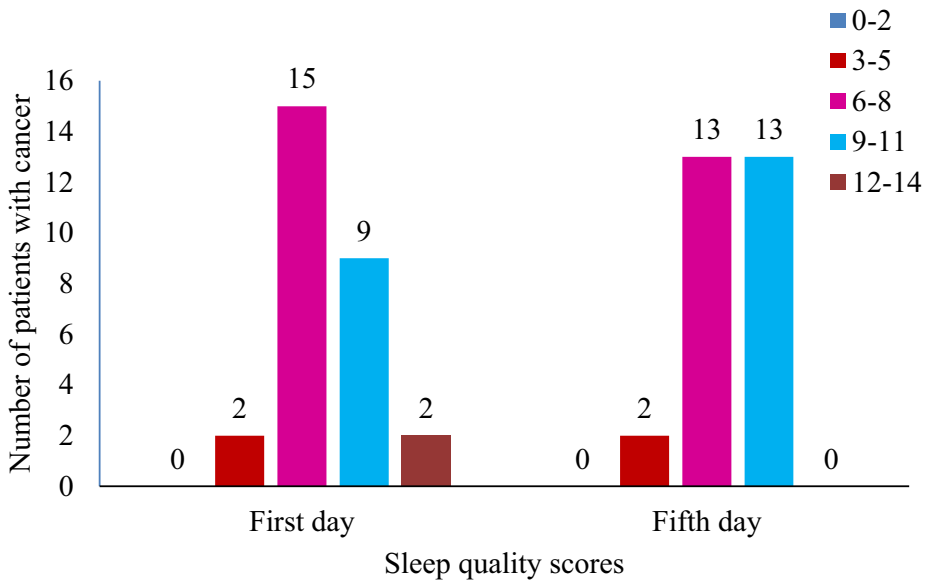


Figure 4.3.6.1

Comparison on Sleep Quality scores among Patients with Cancer in Experimental and Control group after Warm Footbath



Section IV

4.4 Effect of Warm Footbath on Quality of Sleep among Patients with Cancer in Experimental and Control group

This section deals with the analysis and interpretation of effect of warm foot bath on quality of sleep among patients with cancer and the analyzed data was presented under the following heading. Post test analysis on quality of sleep among patients with cancer based on Groningen sleep quality scale.

- Comparison on quality of sleep among patients with cancer in Experimental and Control group on first day after warm footbath.
- Comparison on quality of sleep among patients with cancer in Experimental group on first and fifth day after warm footbath.
- Comparison on quality of sleep among patients with cancer in Control group on first day and fifth day.
- Effect of warm foot bath on quality of sleep among patients with cancer in Experimental and Control group on fifth day.

Table 4.4.1

Comparison on quality of sleep among patients with cancer in the Experimental and control group on first day after Warm Footbath

	Group	Mean	SD	Mean difference	't' value
Quality of sleep	Experimental Group	6.28	2.20	-2.25	4.31***
	Control Group	8.53	1.99		

***Significant at 0.001 level

Unpaired 't' test was used to compare the effect of warm foot bath on quality of sleep among patients with cancer in the experimental and control group on first day. It was identified that the mean value of quality of sleep among patients with cancer in the experimental and control group was 6.28 (SD=2.20) and 8.53 (SD= 1.99) respectively with a mean difference of -2.25. The calculated 't' value 4.31 was found to be greater than the table value of 3.46 at 0.001 level of significance. Hence, it shows that there is highly significant difference in the quality of sleep among patients with cancer after warm foot bath in the experimental group**.**

Table 4.4.2

Comparison on Quality of Sleep among Patients with Cancer in the Experimental Group after Warm Footbath on first and fifth day

(n=56)

Quality of sleep	Mean	SD	Mean difference	't' value
First Day	6.14	2.16	2.18	4.16***
Fifth Day	3.96	1.7		

***Significant at 0.001 level

Paired 't' test was used to compare the effect of warm footbath on quality of sleep among patients with cancer in the experimental group on first day and fifth day. It was identified that the mean value of quality of sleep among patients with cancer in the experimental group on first day and fifth day was 6.14 (SD = 2.16) and 3.96 (SD = 1.7) respectively with a mean difference of 2.18. The calculated 't' value 4.16 was found to be greater than the table value of 3.69 at 0.001 level of significance. Hence, it shows that there is highly significant difference in the quality of sleep among patients with cancer after warm foot bath in the experimental group and control group.

Figure 4.4.1

Comparison on Quality of Sleep among Patients with Cancer in Experimental and Control group on first day after Warm Footbath

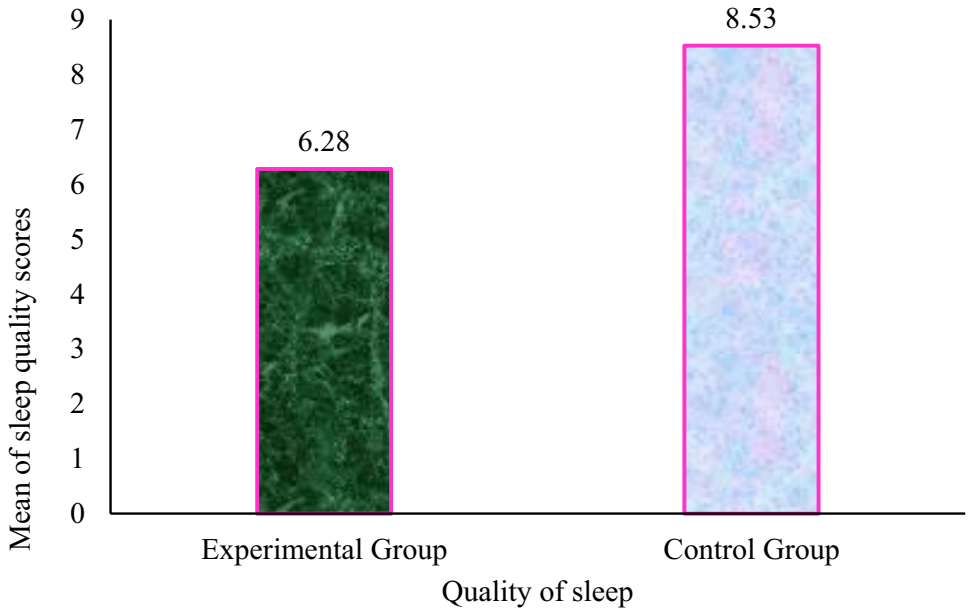


Figure 4.4.2

Comparison on Quality of Sleep among Patients with Cancer in the Experimental Group on first and fifth day after Warm Footbath

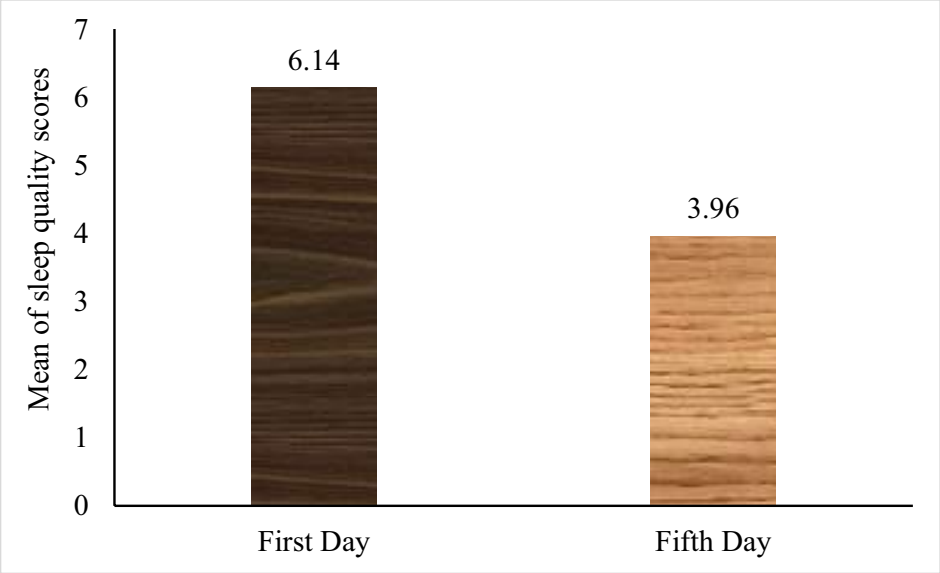


Table 4.4.3

Comparison on Quality of Sleep among Patients with Cancer in Control group on first and fifth day

(n=56)

Quality of sleep	Mean	SD	Mean difference	't' value
First Day	8.21	1.96	0.14	0.26
Fifth Day	8.07	1.70		

Paired 't' test was used to compare the effect of warm footbath on quality of sleep among patients with cancer in the control group on first day and fifth day. It was identified that the mean value of quality of sleep among patients with cancer in the control group on first day and fifth day was 8.21 (SD=1.96) and 8.07 (SD=1.70) respectively with a mean difference of 0.14. The calculated ‘t’ value 0.26 was found to be less than the table value of 2.05 at 0.05 level of significance. Hence, it shows that there is no significant difference in the quality of sleep among patients with cancer in the control group.

Table 4.4.4

Effect of Warm Footbath on Quality of Sleep among Patients with Cancer in the Experimental and Control group on fifth day

(n=56)

	Group	Mean	SD	Mean difference	't' value
Quality of sleep	Experimental Group	3.96	1.7	-4.11	10.02***
	Control Group	8.07	1.70		

***Significant at 0.001 level

Un paired 't' test was used to compare the effect of warm foot bath on quality of sleep among patients with cancer in the experimental and control group on fifth day. It was identified that the mean value of sleep quality scores among patients with cancer in the experimental and control group was 3.96 (SD =1.7) and 8.07 (SD = 1.70) respectively with a mean difference of -4.11. The calculated 't' value 10.02 was found to be greater than the table value of 3.46 at 0.001 level of significance. Hence, it shows that there is highly significant difference in the quality of sleep among patients with cancer after warm foot bath.

Thus, the research hypothesis H_1: "There will be a significant difference in the quality of sleep among patients with cancer in experimental and control group after warm footbath" is accepted.

Figure 4.4.3

Comparison on Quality of Sleep among Patients with Cancer in Control group on first and fifth day

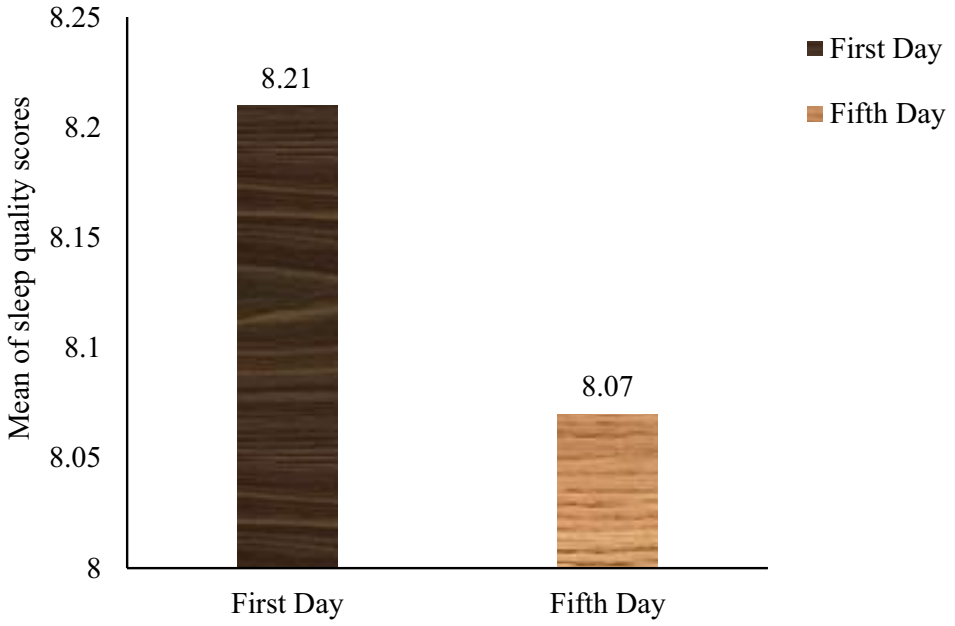
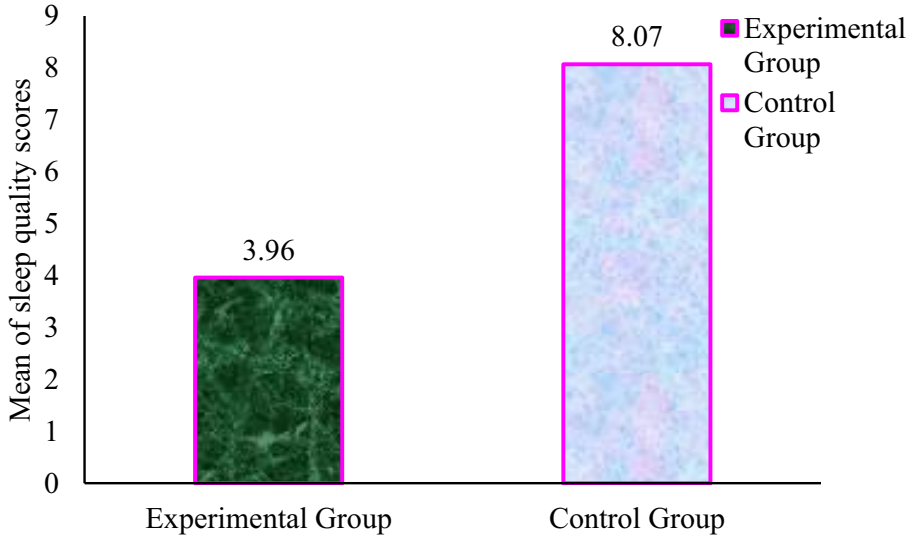


Figure 4.4.4

Effect of Warm Footbath on Quality of Sleep among Patients with Cancer in the Experimental and Control group on fifth day



RESULTS AND DISCUSSION

This chapter deals with the interpretation of the results, discussions and findings. The main aim of the study was to assess the effect of warm footbath on quality of sleep among patients with cancer. The study was conducted at Sri Ramakrishna hospital, Coimbatore. Quasi experimental, post-test only control group design with purposive sampling technique was adopted for this study. Sample of 56 patients were alternatively assigned to the experimental and control group. Warm foot bath was administered by the researcher for a duration of 15 minutes for five consecutive days in the experimental group. On the other hand, routine care was given for patients in the control group. Post test was done for both experimental and control group for first day and fifth day to assess the quality of sleep among patients with cancer by using Groningen sleep quality scale.

The findings are discussed under the following headings.

5.1 Findings related to Demographic variables

The age of patients with cancer shows that, 11 (39.2%) patients were belonged to the age group of 61-70 years and in the control group 11 (39.2%) patients were belonged to the age group of 61-70 years.

Palesh, O.G. (2009) conducted a study on prevalence of sleep disturbances among 823 patients, the majority of 621 (75.5%) patients experienced insomnia, were belonged to the age of 58 years and above.

The gender of patients with cancer reveals that, in the experimental group, the 17 (60.7%) patients were males and in the control group, 19 (67.9%) were also males.

The educational status of patients with cancer shows that in the experimental group 15 (53.6%) patients were illiterate and in the control group 3 (46.42%) patients were also illiterate.

The occupational status of patients with cancer reveals that in the experimental group, 15 (53.5%) patients were employed and in the control group, 19 (67.9%) patients were employed.

The monthly income of patients with cancer shows that in the experimental group, 11 (39.2%) patients had monthly income above Rs. 15001 and 1 (3.6%) patient had monthly income below Rs. 5000. In the control group, 2 (7.1%) patients had monthly income below Rs. 5000 and 11(39.3%) patients had monthly income between Rs. 10,001-15,001.

5.2 Findings related to Clinical variables

The diagnosis of patients with cancer reveals that in the experimental and control group 5 (17.9%) and 6 (21.4%) patients had the diagnosis of cancer esophagus.

The family history of patients with cancer shows that, in the experimental group, 27 (96.4%) patients had no family history of cancer. In the control group, 26 (92.9%) patients had no family history of cancer.

The co-morbid illnesses of patients with cancer reveals that in the experimental group, 22 (78.5%) patients did not have any co-morbid illnesses and in control group 19 (67.9%) patients did not have any co-morbid illnesses.

The number of chemotherapy cycles of patients with cancer shows that, in the experimental group, 8 (28.5%) patients had undergone 4 cycles of chemotherapy and in the control group, 11 (39.3%) patients had undergone 2 cycles of chemotherapy.

The number of radiation cycles of patients with cancer shows that in the experimental group, two patients had undergone 4 and 5 cycles of radiation therapy respectively and in the control group two patients had undergone 4 and 8 cycles of radiation therapy respectively .

The heamoglobin level of patients with cancer shows that in the experimental group 16 (57.14%) male patients had Hemoglobin level between 14.5-16.5 gm/dL and 2 (7.14%) male patients had hemoglobin level below 12mg/dl. In the control group 14 (50%) male patients had hemoglobin level between 14.5-16.5 gm/dL and none of them had above 16.5 gm/dL.

The WBC level of patients with cancer reveals that, in the experimental group 15 (53.6%) male patients had WBC level between 3500-10,500 cmm and in the control group, 18 (64.29%) male patients had WBC level between 3500-10,500 cmm.

None of the patients used any techniques for sleeping at home such as music, reading or meditation in the experimental and control group.

None of the patients had any influencing factors such as diet, noise, etc. that affect their quality of sleep in the experimental and control group.

5.3. Objective 1: To assess the Quality of Sleep among Patients with Cancer

Assessment on quality of sleep among patients with cancer in the experimental group after warm footbath reveals that, 10 (35.7%) patients had normal and disturbed sleep on first day, whereas 23 (82.1%) patients had normal sleep on fifth day.

Assessment on quality of sleep among patients with cancer in the control group shows that 17 (60.7%) patients had poor sleep on first day and 18 (64.28%) patients had poor sleep on fifth day.

Comparison on quality of sleep among patients with cancer in experimental and control group after warm footbath reveals that in the experimental group, 10 (35.7%) patients had normal and disturbed sleep on first day and 23 (82.1%) patients had normal sleep on fifth day. In the control group, 17 (60.7%) patients had normal sleep on first day and 18 (64.28%) patients had poor sleep on fifth day.

The assessment on sleep quality scores among patients with cancer in the experimental group after warm footbath shows that 15 (53.6%) had the sleep quality score between 6-8 on the first day and 16 (57.14%) patients had sleep quality score between 3-5 on the fifth day.

The assessment on sleep quality scores among patients with cancer in the control group shows that 15 (53.6%) had the sleep quality score between 6-8 on the first day and 13 (46.43%) patients had sleep quality score between 6-8 and 9-11 on the fifth day respectively.

5.4 Objective 2: To Evaluate the Effect of Warm Footbath among Patients with Cancer.

Out of the 56 samples, 28 patients were assigned to experimental group and 28 patients were assigned to the control group. The effect of warm footbath on quality of sleep among patients with cancer was evaluated by using paired and unpaired ‘t’test.

5.4.1. Comparison on quality of sleep among patients with cancer in the experimental and control group

Unpaired 't'test was used to assess the quality of sleep among patients with cancer in experimental and control group on first day after warm footbath. It shows that, the mean value of sleep quality scores and standard deviation in the experimental group was 6.28 and 2.20 respectively and in the control group was 8.53 and 1.99 respectively with a mean difference of -2.25. The calculated 't' value 4.89 was found to be greater than the table value of 3.46 at 0.001 level of significance. The result shows a highly significant difference in the quality of sleep among patients with cancer in the experimental and control group after warm foot bath**.**

5.4.2 Comparison on Quality of Sleep among Patients with Cancer in Experimental Group after Warm Footbath on first and fifth day

The quality of sleep among patients with cancer in experimental and control group on first day and fifth day after warm footbath shows that, the mean value of sleep quality scores and standard deviation in the experimental group on first day was 6.14 and 2.16 respectively and on fifth day was 3.96 and 1.7 respectively with a mean difference of 2.18. The calculated 't' value 4.16 was found to be greater than the table value of 3.69 at 0.001 level of significance. The result shows a highly significant difference in the quality of sleep among patients with cancer in experimental group on first day and fifth day after warm foot bath**.**

5.4.3 Comparison on Quality of Sleep among Patients with Cancer in Control group on first and fifth day

The quality of sleep among patients with cancer in control group on first day and fifth day was done by using paired 't'test. It shows that, the mean value of sleep quality scores and standard deviation in the control group on first day was 8.21 and 1.96 respectively and on fifth day was 8.07 and 1.70 respectively with a mean difference of 0.14. The calculated 't' value 0.26 was found to be less than the table value of 2.05 at 0.05 level of significance. The result shows that there is no significant difference in the quality of sleep among patients with cancer in control group.

5.4.4 Effect of Warm Footbath on Quality of Sleep among Patients with Cancer in the Experimental and Control group on fifth day

The effect of warm footbath on quality of sleep among patients with cancer in the experimental and control group on fifth day shows that, the mean value of sleep quality scores and standard deviation in the experimental group on fifth day was 3.96 and 1.7 respectively and in the control group was 8.07 and 1.70 respectively with a mean difference of -4.11. The calculated 't' value 10.02 was found to be greater than the table value of 3.46 at 0.0001 level of significance. The result shows highly significant difference in the quality of sleep among patients with cancer after warm foot bath.

Thus the research hypothesis H_1: "There will be a significant difference in the quality of sleep among patients with cancer in experimental and control group after warm footbath" is accepted.

The result of the present study goes in line with a study conducted by Huei-Lin Yang et al (2010) on effects of warm-water footbath on relieving fatigue and insomnia of the gynecologic cancer patients receiving chemotherapy. The results showed that warm-water footbath was reducing fatigue and insomnia of gynaecological cancer patients during chemotherapy. The gynaecological cancer patients in the experimental group reported a significant difference in the sleep quality scores than in the control group ($P<.001$).

SUMMARY AND CONCLUSION

This chapter deals with the findings, limitations, suggestions for further study and implications for nursing education, practice, administration and research. This study was conducted to find the effect of warm footbath among patients with cancer in selected hospital at Coimbatore.

Quasi experimental post-test only control group design was used for the study. Helping art of clinical nursing theory by Ernestine Wieden Bach (1964) was adopted for preparing conceptual framework of the study. The study was conducted in the oncology ward and special wards of Sri Ramakrishna hospital, Coimbatore. Groningen sleep quality scale was used to assess the quality of sleep among patients with cancer. Fifty six samples were selected for the study. Among 56 samples, 28 samples were assigned to experimental and control group respectively on the basis of alternative assignment. Warm foot bath was administered by the researcher for a duration of 15 minutes for five consecutive days in patients of experimental group. On the other hand, routine care was given for patients in the control group. Post test was done on the first and fifth day to assess the quality of sleep in the experimental group and control group by using Groningen sleep quality scale. The data analysis was done by using descriptive and inferential statistics.

6.1 Major Findings of the Study

6.1.1 In the experimental group 11 (39.2%) patients belonged to the age group of 61-70 years and in control group, 11 (39.2%) patients belonged to the age group of 61-70 years.

6.1.2 In the experimental group majority, 17 (60.7%) patients were males and in control group, 19 (67.9%) patients were also males.

6.1.3 In the experimental group, 15 (53.6%) patients and in control group, group 13 (46.42%) patients were illiterate .

6.1.4 The majority of the patients, 15 (53.5%) in the experimental group and in control group 19 (67.9%) were employed.

6.1.5 In the experimental group, 11 (39.2%) patients had monthly income above Rs. 15001 and in the control group, 11 (39.3%) patients had monthly income between Rs. 10,001-15,001.

6.1.6 In the experimental group 5(17.9%) and in control group 6(21.4%) were diagnosed with cancer esophagus.

6.1.7 The majority of the patients both 27 (96.4%) in experimental and 26 (92.9%) in control group had no family history of cancer.

6.1.8 The majority of patient both in experimental group 22 (78.5%) and control group 19 (67.9%), didn't have any co-morbid illnesses.

6.1.9 In the experimental group, (28.5%) had undergone 4 cycles of chemotherapy and in the control group, 11 (39.3%) patients had undergone 2 cycles of chemotherapy.

6.1.10 In the experimental group majority, males 16(57.14%) had hemoglobin level between 14.5-16.5mg/dL in females 10 (35.72%) had hemoglobin level below 12mg/dL and in the control group majority, half of the males 14 (50%) had hemoglobin level between 14.5-16.5mg/dL and in females 3 (10.71%) had hemoglobin level below 12mg/dL.

6.1.11 The majority of the patients both, 15 (53.6%) in the experimental group and 18(64.29%) in the control group had WBC level between 3500-10, 500 cmm.

6.1.11 The assessment of quality of sleep among patients with cancer revealed that majority of patients, 23 (82.1%) in the experimental group had experienced normal sleep on fifth day and in control group 18 (64.28%) patients had experienced poor sleep on fifth day.

6.1.12 The assessment of sleep quality scores among patients with cancer revealed that majority, 16 (57.14%) patients in the experimental group had the score between 3-5 on the fifth day and in control group 26 (46.43%) patients had the sleep quality score between 6-8 and 9-11 respectively on fifth day.

6.1.13 The effect of Warm Footbath on Quality of Sleep among Patients with Cancer in the Experimental and Control group on fifth day, was identified that, mean value of 3.96 (SD =1.7) and 8.07 (SD = 1.70) respectively with a mean difference of -4.11. The calculated 't' value 10.02 was found to be greater than the table value of 3.46 at 0.001 level of significance. Hence, it shows that there is highly significant difference in the quality of sleep among patients with cancer after warm foot bath. Thus the research hypothesis H_1: "There will be a significant difference in the quality of sleep among patients with cancer in experimental and control group after warm footbath" is accepted .

6.2 Limitations

6.2.1 The researcher needed assistants to provide warm footbath for more than two patients.

6.2.2 Generalisation was not possible due to small sample size.

6.3 Recommendations

6.3.1 The study can be replicated with larger samples which will facilitate generalisations.

6.3.2 A similar study can be conducted to identify the long term effect of warm footbath among patients with cancer.

6.3.3 Sleep assessment tool can be included in the clinical practice to identify the sleep disturbances among patients with cancer .

6.4 Nursing Implications

6.4.1 Nursing Education

The nursing curriculum should include the warm footbath as a complementary therapy, since warm footbath is effective in improving the quality of sleep among patients with cancer. Nurse educators need to have knowledge and awareness on warm footbath, as it is an effective measure to improve the quality of sleep. Steps should be taken to include the assessment of sleep among patients with cancer to meet their need.

6.4.2 Nursing Administration

Nurse administrators can motivate the nurses to assess the sleep among patients with cancer and provision of warm footbath to improve their quality of sleep. Thereby nurses can update the knowledge about various complementary therapies which are useful for clinical practice through in-service and continuing education.

6.4.3 Nursing Practice

The nurse working in the hospitals should be trained to assess the quality of sleep and identify the disturbance in quality of sleep among patients with cancer and its consequences and the implementation of warm footbath to improve the quality of sleep as adjunctively to other pharmacological treatment to promote comfort and well being and a faster recovery.

6.4.4 Nursing Research

The study has tested the effectiveness of warm footbath in improving the quality of sleep among patients with cancer. There is a great need of research to be conducted in the areas of sleep disorders among patients with cancer and on non pharmacological nursing interventions like warm footbath. The nursing research need to focus more on the evidence based and holistic practice through understanding the various techniques that can bring improvement in quality of sleep among patients with cancer. The nursing research is intended to offer, up to date suggestions in implementing warm footbath as one of the nursing intervention and thus it is an affordable and effective way for improving the quality of sleep.

6.4 Conclusion

Cancer has a reputation as deadly disease. People with cancer often undergo physical and emotional disturbances due to their diagnosis of cancer. Disturbed sleep has functional consequences as it has been associated with poor quality of life.

The non-pharmacological interventions such as complimentary treatments produce reliable changes in sleep patterns among patients with cancer. Warm footbath gives a good sleep, by relaxing body and mind. According to the present study conducted, warm footbath resulted in improved quality of sleep among patients with cancer. This indicates that warm footbath is an important non pharmacological method to enhance the quality of sleep among patients with cancer.

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TOOL TO ASSESS THE QUALITY OF SLEEP AMONG PATIENTS WITH CANCER

SECTION A

Demographic Variables

i. Sample no. :

ii. Age :

iii. Gender :

iv. Ward :

v. Education

a) Illiterate b)Primary school c) High school

d) Higher Secondary e) Graduate

vi. Occupation

a) Employed b)Unemployed

vii. Monthly Income

a) Below 5000 b)5000-10,000 c)10,000-15,000 d)Above 15,000

Clinical Variables

i. Diagnosis :

ii. Family history of cancer: :

iii. Co-morbid illness:

iv. No. of Chemotherapy cycle: ☐

v. No. of radiation cycle: ☐

vi. Laboratory findings ☐

a) Hemoglobin:

b)WBC: ☐

vii. Techniques used for sleeping usually at home

a) Music b) Reading c) Meditation d) Any other, specify

viii. Any influencing factors

a) Diet b) Light c) Noise d) Stress e) Pain f) Nausea

g) Vomiting h) Any other, specify

SECTION - B

The Groningen Sleep Quality Score

Please put a (✓) if the answer is yes and (×) if the answer is no.

SL.NO	QUESTION	YES ✓	NO ×
1.	I had a deep sleep last night		
2.	I feel that I slept poorly last night		
3.	It took me more than half an hour to fall asleep last night		
4.	I woke up several times last night		
5.	I felt tired after waking up this morning		
6.	I feel that I didn't get enough sleep last night		
7.	I got up in the middle of the night		
8.	I felt rested after waking up this morning		
9.	I feel that I only had a couple of hours' sleep last night		
10.	I feel that I slept well last night		
11.	I didn't sleep a wink last night		
12.	I didn't have trouble falling asleep last night		
13.	After I woke up last night, I had trouble falling asleep again		
14.	I tossed and turned all night last night		
15.	I didn't get more than 5 hours' sleep last night		
	SCORE		

SCORE INTERPRETATION:

Scoring : The first question out of the fifteen does not count for the total score.

One point : If answer is '**true**' for questions 2,3,4, 5, 6, 7, 9, 11,13, 14, 15

One point : If answer is '**false**' for questions 8, 10, 12.

Interpretation:

The Total score : 14

Score 0 to 5 = Undisturbed or Unrestricted Sleep Last Night

Score 6 – 7 = Disturbed Sleep Last Night

Score 8 – 14 = Indicating Poor Sleep the Night Before

கேள்வித்தாள்

வழிமுறைகள்:

தயவு செய்து கவனமாக படிக்கவும் பிறகு குறிகள் இட்டு பின்வரும் அறிக்கைகள் உண்மையா (✓)அல்லது பொய்யா (✗) என்பதை குறிக்கவும்:

1. நான் நேற்று இரவு ஆழ்ந்தது ாக்கத்திற்குள் இருந்தேன் ☐
2. நேற்று இரவு நான் நன்றாக தூங்காதது போல் உணர்கிறேன். ☐
3. நேற்று இரவு தூக்கம் வருவதற்கு அரைமணி நேரம ஆகியது. ☐
4. நான் நேற்று இரவு பலமுறை விழித்தேன். ☐
5. நான் இன்றுகாலையில் எழுகையில் களைப்பாக இருந்தேன் ☐
6. எனக்கு நேற்று இரவு போதுமான தூக்கம இல்லை. ☐
7. நான் நடு இரவில் விழித்தேன். ☐
8. நான் காலையில் எழுந்ததும் புத்துணர்வுடன் இருப்பதை உணர்ந்தேன் ☐
9. நான் நேற்று இரவு இரண்டு மணிநேரம் மட்டுமே தூங்கினேன் ☐
10. நான் நேற்று இரவு நன்றாக தூங்கினேன் ☐
11. நான் நேற்று இரவு ஒருகண் சிமிட்டும் நேரம் கூட தூங்கவில்லை. ☐
12. நான் நேற்று இரவு தூங்கும் போது தொந்தரவு ஒன்றுமில்லை.
13. நான் நேற்று இரவு விழித்தபிறகு, நான் மீண்டும் தூங்குவது கடினமாக இருந்தது. ☐
14. நான் நேற்று இரவு முழுதும் புரண்டவாறு படுத்திருந்தேன் ☐
15. எனக்கு நேற்று இரவு 5மணி நேரத்திற்கு மேல் தூக்கம் வரவில்லை. ☐

Annexure I

Effect of Warm Footbath on Quality of Sleep among Patients with Cancer in Experimental and Control group

Unpaired 't' test was used to analyze the quality of sleep among patients with cancer in experimental and control group.

$$t = \frac{\overline{X_1} - \overline{X_2}}{SE}$$

Where,

$$\text{SE (Standard error)} = \text{SD} \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

$$\text{SD (Combined standard deviation)} = \sqrt{\frac{\sum\left(x_1 - \overline{x_1}\right)^2 + \sum\left(x_2 - \overline{x_2}\right)^2}{n_1 + n_2 - 2}}$$

$\overline{X}_1$ = Mean of the experimental group post test

$\overline{X}_2$ = Mean of the control group post test

n_1 = Number of samples in experimental group

n_2 = Number of samples in control group

Annexure I-1

Comparison on Quality of Sleep among Patients with Cancer in Experimental and Control group on first day after Warm Footbath

S.No	Experimental Group			Control Group		
	X_1	$X-\overline{X1} = D_1$	$D1^2$	X_2	$X-\overline{X2} = D_2$	$D2^2$
1.	6	-0.14	0.02	8	-0.21	0.04
2.	1	-5.14	6.41	7	-1.21	1.46
3.	8	1.86	3.46	5	-3.21	10.30
4.	8	1.86	3.46	8	-0.21	0.04
5.	8	1.86	3.46	7	-1.21	1.46
6.	8	1.86	3.46	8	-0.21	0.04
7.	7	0.86	0.73	7	-1.21	1.46
8.	6	-0.14	0.02	4	-4.21	17.72
9.	7	-0.86	0.74	6	-2.21	4.88
10.	9	-2.86	8.18	9	-0.79	0.62
11.	7	-0.86	0.74	13	-4.79	22.94
12.	7	-0.86	0.74	13	-4.79	22.94
13.	3	-3.14	9.86	8	-0.21	0.04
14.	5	-1.14	1.3	7	-1.21	1.46
15.	6	-0.14	0.02	10	-1.79	3.20
16.	4	-2.14	4.57	9	-0.79	0.62
17.	4	-2.14	4.58	9	-0.79	0.62
18.	8	-1.86	3.48	9	-0.79	0.62
19.	5	-1.14	1.3	7	-1.21	1.44
20.	7	-0.86	0.74	7	-1.21	1.44
21.	7	-0.86	0.74	9	0.79	0.62
22.	3	-3.14	9.86	10	1.79	3.20
23.	5	-1.14	1.3	8	-0.21	0.04
24.	9	-2.86	8.18	7	-1.21	1.44
25.	10	-3.86	14.89	11	-2.79	0.62
26.	7	-0.86	0.74	7	-1.21	1.44
27.	5	-1.14	1.3	9	-0.79	0.62
28.	2	-4.14	17.14	8	-0.21	0.04
			131.42			101.36

$$SD = \sqrt{\frac{\sum\left(x_1 - \overline{x_1}\right)^2 + \sum\left(x_2 - \overline{x_2}\right)^2}{n_1 + n_2 - 2}} = \sqrt{\frac{131.42+101.36}{28+28-2}} = 2.07$$

$$SE = SD\sqrt{\frac{1}{n_1}+\frac{1}{n_2}} = 2.07\sqrt{\frac{1}{28}+\frac{1}{28}} = 0.48$$

$$t = \frac{\overline{X_1} - \overline{X_2}}{SE} = \frac{6.14 - 8.21}{0.48} = -4.31$$

$$\boxed{t = 4.31}$$

Annexure I-2

Effect of Warm Footbath on Quality of Sleep among Patients with Cancer in Experimental and Control group on fifth day

S.No	Experimental Group			Control Group		
	X_1	$X-\overline{X1} = D_1$	$D1^2$	X_2	$X-\overline{X2} = D_2$	$D2^2$
1.	2	-1.96	3.84	8	-0.07	0.004
2.	6	2.04	4.16	9	0.93	0.86
3.	3	-0.96	0.92	11	2.93	8.58
4.	1	-2.96	8.76	9	0.93	0.86
5.	1	-2.96	8.76	5	-3.07	9.42
6.	3	-0.96	0.92	7	-1.07	1.14
7.	6	2.04	4.16	9	0.93	0.86
8.	6	2.04	4.16	7	-1.07	1.14
9.	3	-0.96	0.92	10	1.93	3.72
10.	6	2.04	4.16	5	-3.07	9.42
11.	5	1.04	1.08	9	0.93	0.86
12.	8	4.04	16.32	8	-0.07	0.004
13.	4	0.04	0.001	8	-0.07	0.004
14.	4	0.04	0.001	10	1.93	3.72
15.	2	-1.96	3.84	6	-2.07	4.28
16.	5	1.04	1.08	10	1.93	3.72
17.	4	0.04	0.001	9	0.93	0.86
18.	5	1.04	1.08	9	0.93	0.86
19.	4	0.04	0.001	6	-2.07	4.28
20.	3	-0.96	0.92	7	-1.07	1.14
21.	5	1.04	1.08	11	2.93	8.58
22.	1	-2.96	8.76	8	-0.07	0.004
23.	5	1.04	1.08	8	-0.07	0.004
24.	4	0.04	0.001	10	1.93	3.72
25.	4	0.04	0.001	6	-2.07	4.28
26.	5	1.04	1.08	6	-2.07	4.28
27.	4	0.04	0.001	6	-2.07	4.28
28.	2	-1.96	3.84	9	0.93	0.86
	111		80.92	226		81.74

$$SD = \sqrt{\frac{\sum\left(x_1 - \overline{x_1}\right)^2 + \sum\left(x_2 - \overline{x_2}\right)^2}{n_1 + n_2 - 2}} = \sqrt{\frac{80.92+81.74}{28+28-2}} = 1.73$$

$$SE = SD\sqrt{\frac{1}{n_1}+\frac{1}{n_2}} = 1.73\sqrt{\frac{1}{28}+\frac{1}{28}} = 0.41$$

$$t = \frac{\overline{X_1} - \overline{X_2}}{SE} = \frac{3.96 - 8.07}{0.41} = -10.02$$

t = 10.02

Annexure II

Comparison on Quality of Sleep among Patients with Cancer in Experimental and Control group

Paired 't' test was used to compare the difference between first and fifth day in experimental group.

$$t = \frac{\bar{d}}{SE}$$

where,

SE (Standard Error) $= \frac{SD}{\sqrt{n}}$

SD (Standard Deviation) $= \sqrt{\frac{\Sigma D^2 - \frac{(\Sigma D)^2}{n}}{n-1}}$

$\bar{d}$ = Mean difference between the first and fifth day

ΣD = sum of Mean difference between first and fifth day in experimental group

ΣD^2 = Sum of square of Mean difference between the first and fifth day in experimental group

n = Number of samples

Annexure II-1

Comparison on Quality of Sleep among Patients with Cancer in Control group on first and fifth day

S.No	First day (x_1)	Fifth day (x_2)	$X_1-X_2=D$	D^2
1	8	8	0	0
2	7	9	-2	4
3	5	11	-6	36
4	8	9	-1	1
5	7	5	2	4
6	8	7	1	1
7	7	9	-2	4
8	46	7	-3	9
9	9	10	-4	16
10	13	5	4	16
11	13	9	4	16
12	8	8	5	25
13	7	8	0	0
14	10	10	-3	9
15	9	6	4	16
16	9	10	-1	1
17	9	9	0	0
18	7	9	0	0
19	7	6	1	1
20	7	7	0	0
21	9	11	-2	4
22	20	8	2	4
23	8	8	0	0
24	7	10	-3	9
25	11	6	5	25
26	7	6	1	1
27	9	6	3	9
28	8	9	-1	1
	230	226	4	212

Standard Deviation $= \sqrt{\frac{\Sigma D^2 - \frac{(\Sigma D)^2}{n}}{n-1}} = \sqrt{\frac{212 - \frac{(4)^2}{28}}{27}} = 2.79$

$\bar{d} = \frac{\Sigma D}{n} = \frac{4}{28} = 0.14$

SE $= \frac{SD}{\sqrt{n}} = \frac{2.79}{\sqrt{28}} = 0.52$

t $= \frac{\bar{D}}{SE} = \frac{0.14}{0.52} = 0.26$

t = 0.26

Annexure II-2

Comparison on Quality of Sleep among Patients with Cancer in Experimental Group after Warm Footbath on first and fifth day

S.No	First day (x_1)	Fifth day (x_2)	$X_1-X_2=D$	D^2
1	6	2	4	16
2	1	6	-5	25
3	8	3	5	25
4	8	1	7	49
5	8	1	7	49
6	8	3	5	25
7	7	6	1	1
8	6	6	0	0
9	7	3	4	16
10	9	6	3	9
11	7	5	2	4
12	7	8	-1	1
13	3	4	-1	1
14	5	4	1	1
15	6	2	4	16
16	4	5	-1	1
17	4	4	0	0
18	8	5	3	9
19	5	4	1	1
20	7	3	4	16
21	7	5	2	4
22	3	1	2	4
23	5	5	0	0
24	9	4	5	25
25	10	4	6	36
26	7	5	2	4
27	5	4	1	1
28	2	2	0	0
	172	111	61	339

Standard Deviation $= \sqrt{\frac{\Sigma D^2 - \frac{(\Sigma D)^2}{n}}{n-1}} = \sqrt{\frac{339 - \frac{(61)^2}{28}}{27}} = 2.76$

$\bar{d} = \frac{\Sigma D}{n} = \frac{61}{28} = 2.17$

SE $= \frac{SD}{\sqrt{n}} = \frac{2.76}{\sqrt{28}} = 0.52$

t $= \frac{\bar{D}}{SE} = \frac{2.17}{0.52} = 4.16$

t = 4.16

ANNEXURE III

Content Validity of the Tool

S. No	ITEM	EXPERT							NUMBER OF AGREEMENT	I-CVI
		1	2	3	4	5	6	7		
	Section A Demographic Data									
1.	Sample number	4	4	3	4	4	4	3	7	0.98
2.	Age	3	3	4	4	4	4	4	7	0.98
3.	Gender	4	4	4	4	4	4	3	7	0.98
4.	Ward	3	4	1	4	4	3	4	6	0.84
5.	Education	4	4	4	4	4	3	4	7	0.98
6.	Occupation	4	4	4	4	1	4	4	6	0.84
7.	Monthly income	4	4	4	4	1	4	4	6	0.84
	Section B Clinical Data									
1.	Diagnosis	4	4	4	4	4	4	4	7	0.98
2.	Family history of cancer	4	4	4	4	4	4	4	7	0.98
3.	Co-morbid illness	4	4	4	4	3	2	4	6	0.84
4.	No. of chemotherapy cycle	4	4	4	4	4	4	4	7	0.98
5.	No.of radiation cycle	4	4	4	4	4	4	4	7	0.98
6.	Laboratory findings	4	4	4	3	4	4	4	6	0.84
7.	Techniques used for sleeping at home	4	4	4	4	3	2	4	6	0.84
8.	Any influencing factors	4	4	4	3	4	4	4	6	0.84
1.	**Section C** Groningen sleep quality scale I had a deep sleep last night	4	4	4	4	4	4	4	7	0.98

S. No	ITEM	EXPERT							NUMBER OF AGREEMENT	I-CVI
		1	2	3	4	5	6	7		
2.	I feel that I slept poorly last night	4	4	4	4	4	4	4	7	0.98
3.	It took me more than half an hour to fall asleep last night	4	4	4	4	4	4	4	7	0.98
4.	I woke up several times last night	4	4	4	4	4	4	4	7	0.98
5.	I felt tired after waking up this morning	4	4	4	4	4	4	4	7	0.98
6.	I feel that I didn't get enough sleep last night	4	4	4	4	4	4	4	7	0.98
7.	I got up in the middle of the night	4	4	4	4	4	4	4	7	0.98
8.	I felt rested after waking up this morning	4	4	4	4	4	4	4	7	0.98
9.	I feel that I only had a couple of hours' sleep last night	4	4	4	4	4	4	4	7	0.98
10.	I feel that I slept well last night	4	4	4	4	4	4	4	7	0.98

S. No	ITEM	EXPERT							NUMBER OF AGREEMENT	I-CVI
		1	2	3	4	5	6	7		
11.	I didn't sleep a wink last night	4	4	4	4	4	4	4	7	0.98
12.	I didn't have trouble falling asleep last night	4	4	4	4	4	4	4	7	0.98
13.	After I woke up last night, I had trouble falling asleep again	4	4	4	4	4	4	4	7	0.98
14.	I tossed and turned all night last night	4	4	4	4	4	4	4	7	0.98
15.	I didn't get more than 5 hours' sleep last night	4	4	4	4	4	4	4	7	0.98